United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of De Witt County, Illinois

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
1902 FOX DRIVE
CHAMPAIGN, ILLINOIS 61820

December 18, 1991

Jim Culver, National Leader, SSQAS
USDA, Soil Conservation Service
345 Federal Building
100 Centennial Mall North
Lincoln, NE 68508

Dear Jim:

Enclosed is a copy of the Soil Survey of DeWitt County, Illinois. This survey was prepared and published by the United States Department of Agriculture, Soil Conservation Service in cooperation with the Illinois Agricultural Experiment Station. The DeWitt County Soil and Water Conservation District was a sponsor of the survey and the DeWitt County Board shared in the cost of doing the field work. The Illinois Department of Agriculture's Division of Natural Resources also shared in the cost of doing the field work.

The soil survey identifies the kinds of soils in DeWitt County. It also provides interpretations of these soils for many farm and nonfarm uses. We hope it will be of value to you and your organization.

Sincerely,

Mark M. Bankland

ACTING FOR
CHARLES WHITMORE
State Conservationist

Enclosure

RLM:lm:soilsur-1

How To Use This Soil Survey

General Soil Map

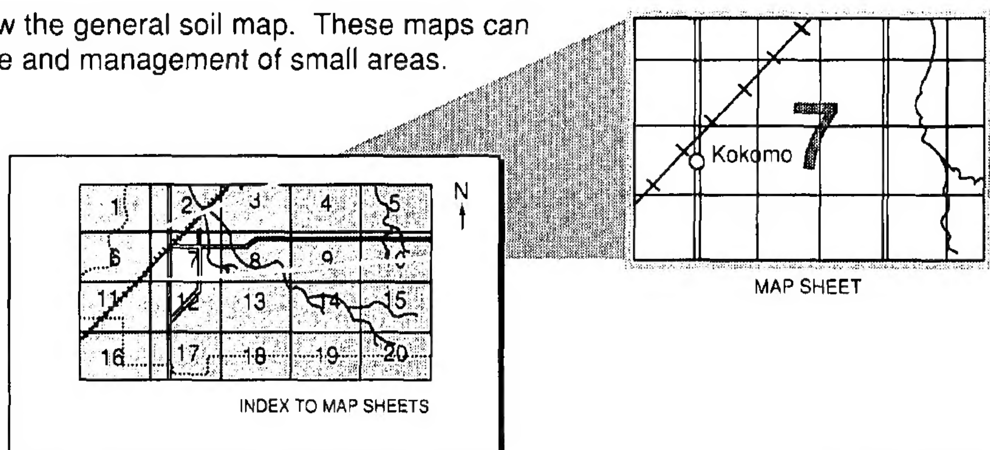
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

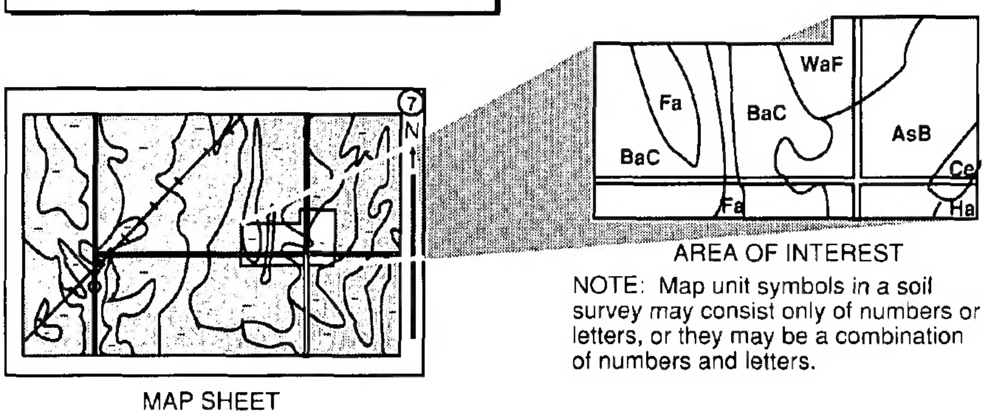
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the De Witt County Soil and Water Conservation District. The cost was shared by the De Witt County Board and the Illinois Department of Agriculture.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 137.

Cover: Gently sloping and sloping soils on the Shelbyville Moraine. Contour farming and terraces help to control erosion on these soils.

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Issued September 1991

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Foreword

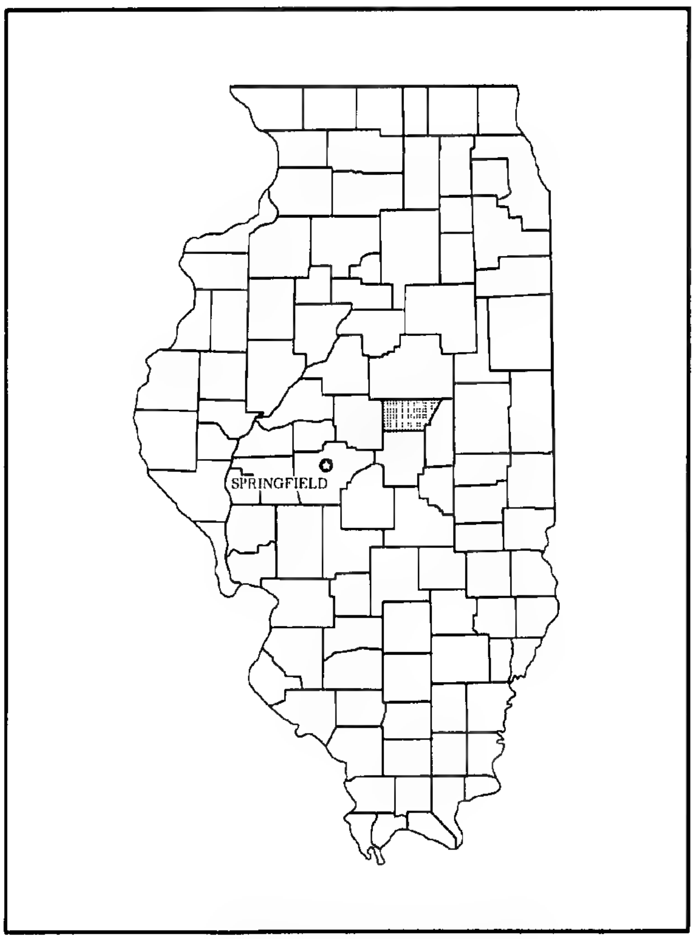
This soil survey contains information that can be used in land-planning programs in De Witt County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of De Witt County in Illinois.

Soil Survey of
De Witt County, Illinois

By Roger D. Windhorn, Soil Conservation Service

Fieldwork by R.D. Windhorn and J. Steinkamp, Soil Conservation Service, and T. Brooks, D. Leach, M. McNamara, D. Mueller, and G. Westphal, De Witt County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

De Witt County is in the east-central part of Illinois. It has a total land area of 253,510 acres, or about 399 square miles. In 1980, it had a population of 18,108. Clinton, the county seat, had a population of 8,014.

This soil survey updates the survey of De Witt County published in 1940 *(8)*. It provides more recent information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information about De Witt County. It describes settlement and development, farming, physiography and drainage, and climate.

Settlement and Development

Evidence suggests that Indians known as Mound Builders were among the first people to inhabit what is now De Witt County *(1)*. The Kickapoo Indians inhabited the survey area just prior to the arrival of the first white settlers *(1, 5)*. As late as 1818, the Kickapoo Tribe numbered about 1,600 in this area. By the time that the settlers arrived a few years later, however, the majority of the Indians had moved westward across the Mississippi River.

The first non-Indian settlers arrived in 1824. They camped along Salt Creek, northwest of the present town of Kenney. These early settlers often used the creeks for fishing and for travel lanes. They also favored the timbered areas because of the availability of firewood, the abundance of game, fear of prairie fires, and the belief that the prairies were in general infertile and unproductive.

In 1826, a second settlement was established around the present location of Waynesville, near Kickapoo Creek. This became the first town in the county. The first settlement around Clinton was on a site about 1 mile west of the present town. Created from portions of McLean and Macon Counties, De Witt County officially became a separate county in 1839. The county was named for De Witt Clinton, Governor of New York. The town of Clinton was platted in 1835 and became the county seat in May of 1839.

The arrival of the railroad industry in 1854 added a much needed overland transportation system to De Witt County and all of central Illinois *(5)*. After the advent of the railroad, the population increased and farming became a much larger part of the local economy.

The town of Clinton has several large factories that manufacture a wide variety of products or that provide numerous services for the surrounding area. The railroad also provides employment for many persons, as does an electrical power generating station.

Transportation systems are well developed in the county. There are three state highways, two U.S. highways, one interstate highway, two railroad lines, and numerous paved county roads.

Farming

The primary enterprise in the county is farming. Corn and soybeans are the main crops. Some areas are used for pasture and hay, although only a few farms have livestock. Most of the livestock is raised in confinement. In 1982, the county had 10,154 hogs and pigs and 5,744 head of cattle and calves *(13)*.

The general trend in the county is toward fewer and larger farms. In 1982, the county had 629 farms, which averaged about 343 acres in size *(13)*. The farms made up 217,358 acres, or about 84 percent of the total area of the county. The total acreage of pasture and cropland was 204,617 acres. Of this acreage, 196,163 acres was used for corn or soybeans, 1,714 acres was used for winter wheat, and 6,263 acres was used for pasture and hay.

Physiography and Drainage

Glacial ice, running water, and windblown deposits are the main factors that have determined the landforms in De Witt County *(14)*. The north-central and southeastern parts of the county are generally nearly level to sloping. In the rest of the county, particularly in the areas along Salt Creek and Kickapoo Creek, slopes range from nearly level to very steep. The greatest change in slope is in areas along the major drainageways, where erosion has caused a 75- to 100-foot drop in elevation from the adjacent uplands. Differences in elevation within the county range from 610 to 811 feet above sea level.

The most noticeable physiographic surface feature in the county is the Shelbyville Moraine *(7)*. This moraine extends diagonally from southeast to northwest across the southwest corner of the county. It marks the farthest advance of the Wisconsin glacier. As one approaches the moraine from the west, one notes a general rise in elevation, as though heading up a long gentle hill, which is the front slope of the moraine. The landform to the west is a nearly level outwash plain. On the east side of the moraine, on the top of the hill, is a more rolling till plain. Within a distance of about 2 miles, elevations across the moraine may change as much as 85 to 95 feet. Although elevations change greatly and landforms differ, many of the soils mapped on the till plain, moraine, and outwash plain are similar because a blanket of windblown loess covers nearly all of the surface features in De Witt County.

The county has two principal drainage systems, both of which ultimately drain into the Illinois River *(1)*. The largest system is Salt Creek and North Fork and their tributaries. This system drains all of the eastern, central, and northeastern parts of the county and extends from the northeast corner of the county to the southwestern part. The other major drainage system is Kickapoo Creek and its tributaries. This system drains the northwestern part of the county.

Surface water in some areas in the southern and southeastern parts of the county drains to the south without entering either of the principal drainage systems. It eventually drains into the Sangamon River, which is outside the county boundaries. Friends Creek is one of the larger drainageways in these areas.

The county has approximately 5,280 acres of impounded water. Clinton Lake makes up about 4,895 acres of this total. The lake at Weldon Springs State Park is approximately 50 acres in size. The rest of the impounded water is in farm ponds or water-filled gravel pits.

Climate

Prepared by the Illinois State Water Survey, Champaign, Illinois.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Decatur in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 29.4 degrees F and the average monthly minimum temperature is 21 degrees. The lowest temperature on record, which occurred at Decatur on January 17, 1977, is -23 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 86.3 degrees. The highest recorded temperature, which occurred at Decatur on July 14, 1954, is 113 degrees.

Growing degree days are shown in table 2. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 39.12 inches. Of this, 26.4 inches, or about 67 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18.43 inches. The heaviest 1-day rainfall during the period of record was 4.76 inches on June 2, 1965.

The average seasonal snowfall is 24 inches. The greatest snow depth at any one time during the period

of record was 20 inches. On the average, 34 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area

dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

In some areas the general soil map of De Witt County does not join exactly with the general soil maps of Logan, McLean, Macon, and Piatt Counties. In a few areas the names of the associations do not agree across county lines because of variations in the extent of the major soils in the associations. The soils or the parent material in these associations and the use and management requirements are similar. The differences in the association names do not significantly affect the use of these maps for general planning.

Soil Descriptions

1. Ipava-Sable-Tama Association

Nearly level and gently sloping, poorly drained to moderately well drained soils formed in loess; on uplands

This association consists of soils on broad plains, ridgetops, and upland flats and in depressions and shallow drainageways. Slopes range from 0 to 5 percent.

This association makes up about 7 percent of the county. It is about 35 percent Ipava soils, 30 percent Sable soils, 20 percent Tama soils, and 15 percent minor soils.

The somewhat poorly drained, nearly level Ipava soils are on low ridges. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is about 11 inches of black, friable silt loam and silty clay loam. The subsoil is silty clay loam about 37 inches thick. It is mottled. The upper part is brown, and the lower part is dark grayish brown and grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, friable silt loam.

The poorly drained, nearly level Sable soils are on broad flats below the Ipava and Tama soils. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

The moderately well drained, gently sloping Tama soils are on ridgetops and side slopes along drainageways. Typically, the surface layer is black, friable silt loam about 6 inches thick. The subsurface layer also is black, friable silt loam about 6 inches thick. The subsoil is about 35 inches thick. The upper part is brown, friable silty clay loam. The lower part is dark yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, friable silt loam.

Of minor extent in this association are the very poorly drained Shiloh soils in shallow depressions.

Most areas are cultivated or are used for pasture and hay. This association is well suited to cultivated crops, pasture, and hay. The seasonal high water table is the major limitation. In the sloping areas water erosion is a hazard.

The seasonal high water table, moderately slow permeability, and the shrink-swell potential are the main limitations on sites for dwellings and septic tank

absorption fields. Because of ponding, the Sable soils generally are unsuitable as sites for dwellings and septic tank absorption fields.

2. Plano-Elburn-Sable Association

Nearly level and gently sloping, well drained, somewhat poorly drained, and poorly drained soils formed in loess and outwash or entirely in loess; on outwash plains, stream terraces, or uplands

This association consists of soils on low, broad ridges and knolls and in nearly level areas between drainageways. Shallow depressions are common. Slopes range from 0 to 5 percent.

This association makes up about 2 percent of the county. It is about 40 percent Plano soils, 30 percent Elburn soils, 20 percent Sable soils, and 10 percent minor soils.

The well drained, nearly level and gently sloping Plano soils are on low ridges, on knolls, and on side slopes along drainageways. They formed in loess and glacial outwash. Typically, the surface layer is very dark brown, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark brown, brown, and dark yellowish brown silty clay loam. The next part is dark yellowish brown silt loam. The lower part is brown and dark yellowish brown, stratified sandy loam, loam, and silt loam.

The somewhat poorly drained, nearly level Elburn soils are on low, broad ridges. They formed in loess and glacial outwash. Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 42 inches thick. The upper part is brown, mottled, friable silt loam and silty clay loam. The next part is brown, mottled, friable silt loam. The lower part is brown, mottled, friable, stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silt loam and sandy loam.

The poorly drained, nearly level Sable soils are on broad flats and in drainageways on uplands. They formed in loess. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

Of minor extent in this association are the poorly drained Thorp soils in shallow depressions.

Most areas are cultivated or are used for pasture and hay. This association is well suited to cultivated crops, pasture, and hay. The seasonal high water table is the major limitation in areas of the Elburn and Sable soils. Water erosion is a hazard in the gently sloping areas of the Plano soils.

The Elburn soils are poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table. The Plano soils are well suited to septic tank absorption fields but are only moderately suited to dwellings because of the shrink-swell potential. Because of ponding, the Sable soils generally are unsuitable as sites for dwellings and septic tank absorption fields.

3. Sawmill-Lawson Association

Nearly level, poorly drained and somewhat poorly drained soils formed in alluvium; on flood plains

This association consists of soils on flood plains, mainly along Salt Creek and other major streams. These soils are occasionally flooded. Slopes range from 0 to 2 percent.

This association makes up about 5 percent of the county. It is about 40 percent Sawmill soils, 37 percent Lawson soils, and 23 percent minor soils.

The poorly drained Sawmill soils are in swales and low areas on the flood plain. Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark gray and gray, mottled, friable and firm silty clay loam about 27 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, friable silty clay loam.

The somewhat poorly drained Lawson soils are in broad areas above the Sawmill soils on the flood plains. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is about 27 inches of black, friable silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown and dark gray, mottled, friable silty clay loam.

Of minor extent in this association are the well drained Camden, Ross, and St. Charles soils. Camden and St. Charles soils are on terraces above the major soils. Ross soils are on natural levees adjacent to the streams.

Most areas are used for cultivated crops. Some are used for pasture, hay, or woodland. Because the

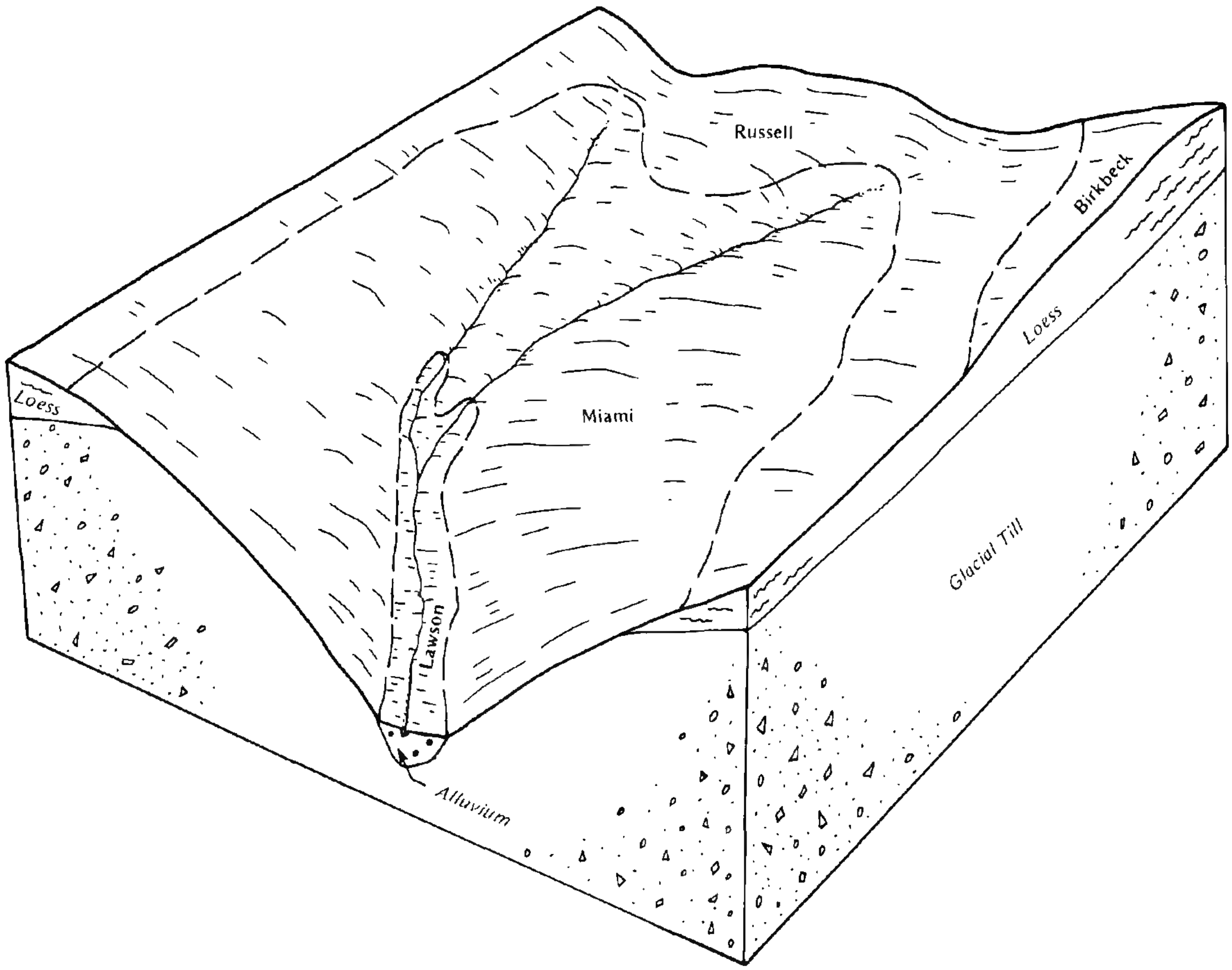


Figure 1.—Typical pattern of soils and parent material in the Miami association.

flooding occurs less often than once in 2 years, this association is well suited to cultivated crops, pasture, and hay. In some years, however, the flooding can delay the harvesting of hay or the planting and harvesting of row crops.

This association is well suited to woodland and to habitat for woodland wildlife. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the flooding.

4. Miami Association

Strongly sloping to very steep, well drained soils formed mainly in glacial till; on uplands

This association consists of soils on side slopes along drainageways and stream valleys. Slopes are generally short and smooth and range from 10 to 50 percent.

This association makes up about 6 percent of the county. It is about 75 percent Miami soils and 25 percent minor soils (fig. 1).

Typically, the surface layer of the Miami soils is very dark gray, friable silt loam or loam about 5 inches thick. The subsurface layer is brown, friable silt loam about 2 inches thick. The subsoil is about 42 inches thick. The upper part is yellowish brown, friable silt loam. The lower part is brown and dark yellowish brown, friable and firm clay loam and loam. The underlying material to a depth of 60 inches or more is brown, mottled, calcareous, firm loam.

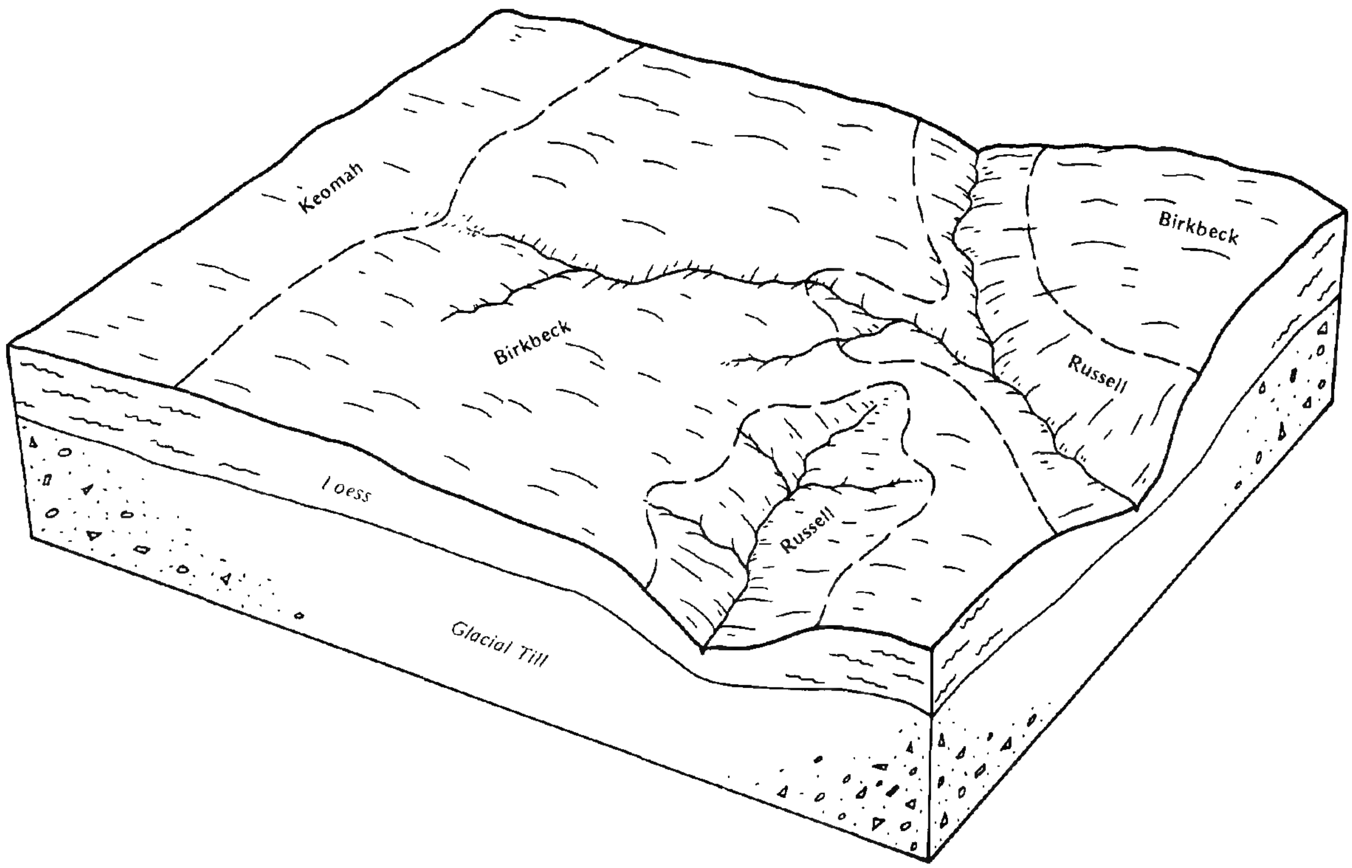


Figure 2.—Typical pattern of soils and parent material in the Birkbeck-Russell-Keomah association.

Of minor extent in this association are the moderately well drained Birkbeck, somewhat poorly drained Lawson, well drained Russell, and poorly drained Sawmill soils. Birkbeck and Russell soils are on side slopes above the Miami soils. Lawson and Sawmill soils are on flood plains below the Miami soils.

Most areas are used as woodland and as habitat for woodland wildlife. Some of the less sloping areas are used as pasture.

This association is well suited to woodland and woodland wildlife habitat. In the areas used as woodland, erosion is a hazard and the slope is a limitation. The less sloping areas are moderately suited to pasture.

5. Birkbeck-Russell-Keomah Association

Nearly level to strongly sloping, well drained to somewhat poorly drained soils formed in loess and glacial till or entirely in loess; on uplands

This association consists of nearly level and gently sloping soils on narrow and moderately wide ridges and sloping and strongly sloping soils on side slopes along drainageways. Narrow flood plains are common. Slopes are generally short and smooth and range from 0 to 15 percent.

This association makes up about 12 percent of the county. It is about 60 percent Birkbeck soils, 20 percent Russell soils, 10 percent Keomah soils, and 10 percent minor soils (fig. 2).

The moderately well drained, gently sloping and sloping Birkbeck soils are on ridges and knolls between the drainageways. They formed in loess and glacial till. Typically, the surface layer is brown, friable silt loam about 3 inches thick. The subsurface layer also is brown, friable silt loam. It is about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, mottled, friable and firm silt loam and silty clay loam. The lower part is yellowish brown, mottled, friable loam.

The well drained, sloping and strongly sloping

Russell soils are on side slopes along drainageways. They formed in loess and glacial till. Typically, the surface layer is mixed dark grayish brown and brown, friable silt loam or silty clay loam about 6 inches thick. It has been thinned by erosion. The subsoil is about 38 inches thick. The upper part is dark yellowish brown and yellowish brown, friable and firm silty clay loam. The lower part is brown and dark yellowish brown, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm clay loam.

The somewhat poorly drained, nearly level Keomah soils are on broad ridges. They formed in loess. Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is grayish brown, friable silt loam about 7 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is brown, friable silty clay loam. The next part is dark grayish brown and grayish brown, firm silty clay and silty clay loam. The lower part is olive gray, friable silt loam. The underlying material to a depth of 60 inches or more is mottled olive gray and yellowish brown, friable silt loam.

Of minor extent in this association are the poorly drained Sable soils in depressions and drainageways below the major soils.

Most areas are used for cultivated crops, pasture, or hay. Some are used as woodland. The nearly level and gently sloping areas are well suited to cultivated crops. The strongly sloping areas are generally unsuited to cultivated crops because of a severe hazard of water erosion. This association is well suited to pasture and hay. Wetness is a limitation in areas of the Keomah soils.

The nearly level and gently sloping soils are poorly suited to septic tank absorption fields, and the sloping soils are moderately suited. The seasonal high water table and restricted permeability are limitations. The nearly level soils are poorly suited to dwellings because of the seasonal high water table. The gently sloping and sloping soils are only moderately suited to dwellings because of the shrink-swell potential and the seasonal high water table.

6. Catlin-Dana Association

Gently sloping and sloping, moderately well drained soils formed in loess and glacial till; on uplands

This association consists of soils on moraines and the adjacent uplands. Most of the association is dissected by narrow drainageways. Slopes are generally long and smooth and range from 2 to 10 percent.

This association makes up about 7 percent of the county. It is about 75 percent Catlin soils, 15 percent Dana soils, and 10 percent minor soils (fig. 3).

The Catlin soils are gently sloping and sloping. Typically, the surface layer is mixed very dark brown and brown, friable silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, yellowish brown, and brown, friable silty clay loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown and yellowish brown, friable, calcareous loam.

The Dana soils are gently sloping. Typically, the surface layer is about 8 inches of very dark grayish brown, friable silt loam mixed with yellowish brown silty clay loam. It has been thinned by erosion. The subsoil is about 39 inches thick. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, friable clay loam. The lower part is brown and yellowish brown, mottled, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam.

Of minor extent in this association are the somewhat poorly drained Ipava and Elburn and well drained Parr soils. Ipava soils are on broad, low ridges behind the moraines. Elburn soils are on broad, low ridges in front of the moraines. Parr soils formed mainly in glacial till on the face of the moraines.

Most areas are used for cultivated crops. A few sloping areas are used as pasture. The gently sloping areas are well suited to cultivated crops, pasture, and hay. The sloping areas are moderately suited to cultivated crops. Water erosion is the main hazard.

This association is moderately suited to dwellings and poorly suited to septic tank absorption fields. The seasonal high water table, restricted permeability, and the shrink-swell potential are limitations affecting these uses.

7. Sable-Ipava-Catlin Association

Nearly level to sloping, poorly drained to moderately well drained soils formed in loess or in loess and glacial till; on uplands

This association consists of soils on broad flats, on low ridges, and on knolls. Shallow depressions are common. Slopes range from 0 to 10 percent.

This association makes up 61 percent of the county. It is about 39 percent Sable soils, 24 percent Ipava soils, 21 percent Catlin soils, and 16 percent minor soils (fig. 4).

The poorly drained, nearly level Sable soils are on

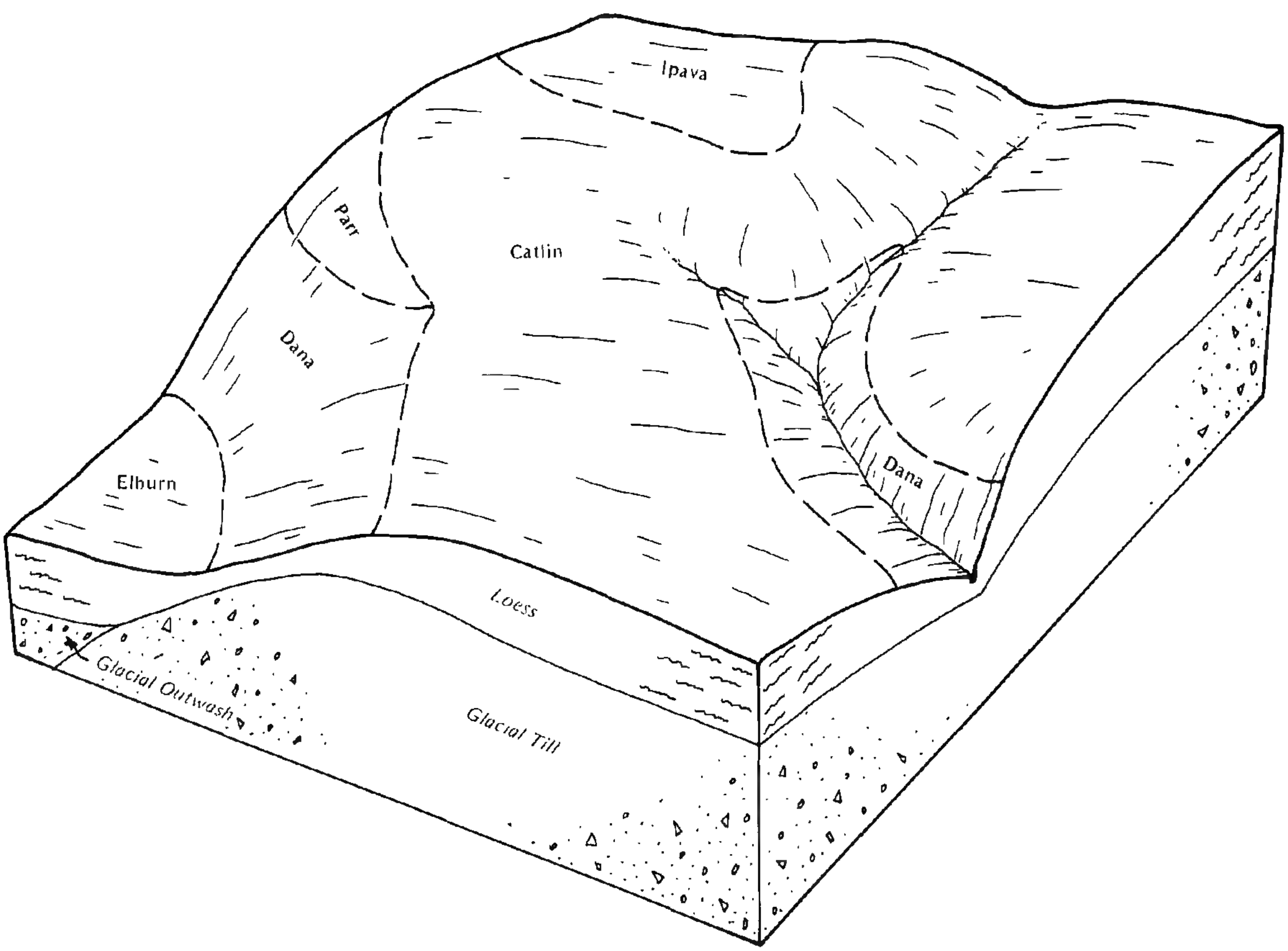


Figure 3.—Typical pattern of soils *and* parent material in the Catlin-Dana association.

broad flats and in shallow depressions and drainageways. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

The somewhat poorly drained, nearly level Ipava soils are on broad, low ridges. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is about 11 inches of black, friable silt loam and silty clay loam. The subsoil is silty clay loam about 37 inches thick. It is mottled. The upper part is brown, and the lower part is dark grayish brown and grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, friable silt loam.

The moderately well drained, gently sloping and sloping Catlin soils are on ridgetops, knolls, and side slopes. Typically, the surface layer is mixed very dark brown and brown, friable silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, yellowish brown, and brown, friable silty clay loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown and yellowish brown, friable, calcareous loam.

Of minor extent in this association are the very poorly drained Peotone soils in shallow depressions below the major soils.

Most areas are used for cultivated crops. Some are

used for pasture and hay. The nearly level and gently sloping areas are well suited to cultivated crops, pasture, and hay. The sloping areas are moderately suited to cultivated crops. The seasonal high water table is a limitation in the nearly level areas, and water erosion is a hazard in the gently sloping and sloping areas.

The Catlin and Ipava soils are poorly suited to septic tank absorption fields. The Ipava soils are poorly suited to dwellings, and the Catlin soils are moderately suited. The seasonal high water table, restricted permeability, and the shrink-swell potential are the main limitations. Because of ponding, the Sable soils generally are unsuitable as sites for septic tank absorption fields.

Broad Land Use Considerations

The soils in De Witt County vary widely in their suitability for major land uses. Most of the land in the county is used for cultivated crops, principally corn and soybeans *(13)*. The cropland is widespread throughout the county, primarily in associations 1, 2, 3, 5, 6, and 7. Associations 1, 2, 5, 6, and 7 are in the uplands. Birkbeck, Catlin, Dana, Elburn, Ipava, Keomah, Plano, Russell, Sable, and Tama are the major soils in these associations. In the nearly level areas used for crops, the major limitation is the seasonal high water table. Water erosion is a hazard in the more sloping areas. The soils in association 3 are occasionally flooded, principally in early spring. The flooding can delay fieldwork and can cause slight or moderate crop damage. Lawson and Sawmill are the major soils in this association.

In 1982, about 2.5 percent of the county was used for pasture and hay *(13)*. All of the associations in the county generally are suitable for grasses and legumes. Water erosion is the main hazard in associations 1 and 2 and in associations 4 to 7. The seasonal high water table is a limitation in nearly level areas. The slope of the steep and very steep soils in association 4 limits the use of seeding equipment and the equipment used in harvesting hay. The occasional flooding in association 3 is a major hazard. It delays hay harvesting in some years.

In 1982, only slightly more than 1 percent of the county was woodland *(13)*. Most of the woodland is in associations 3, 4, and 5. These associations are well suited to woodland. Water erosion is the main hazard,

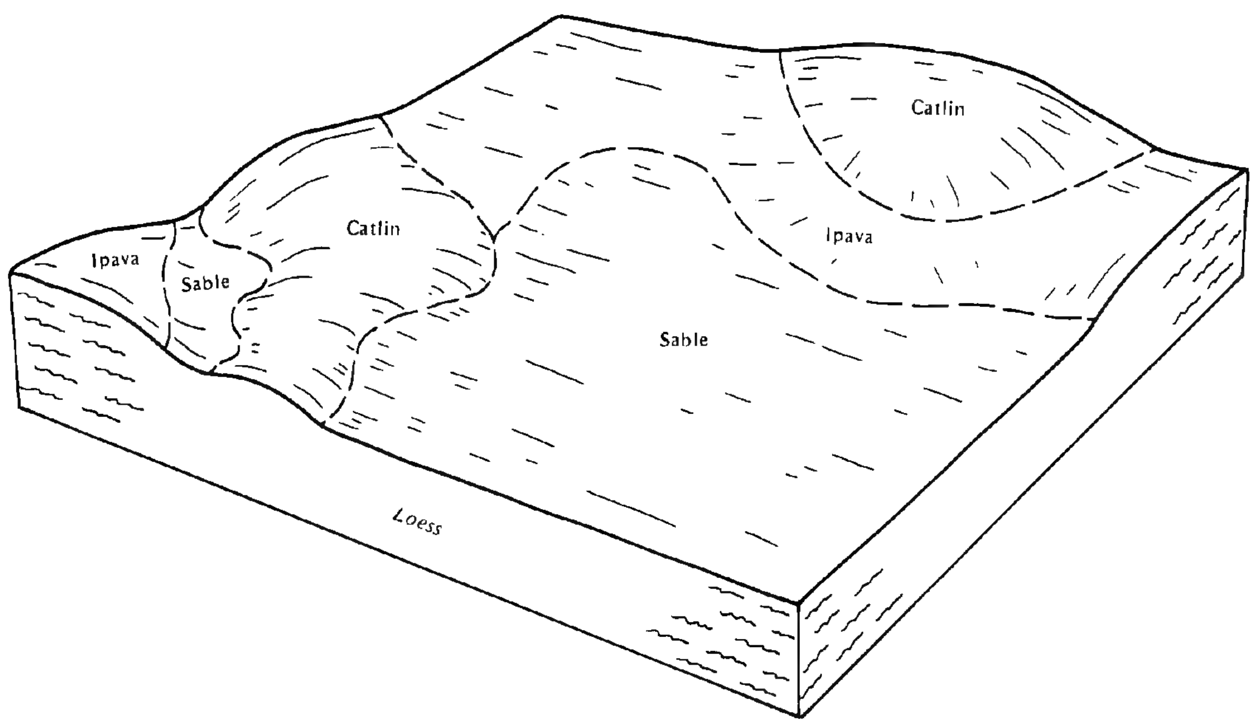


Figure 4.—Typical pattern of soils and parent material in the Sable-Ipava-Catlin association.

Figure 5.—An area of Birkbeck silt loam, 1 to 4 percent slopes, which is well suited to picnic areas.

especially on the very steep slopes. The slope can limit the use of harvesting equipment. The occasional flooding in association 3 is a hazard.

In general, the gently sloping and sloping Camden, Plano, Proctor, and St. Charles soils are the best suited soils in the county for urban uses. These soils are most prevalent on the terraces in areas of associations 2 and 3. Birkbeck, Catlin, Dana, Russell, and Tama soils are moderately suited to urban uses. These soils are most prevalent in associations 1, 4, 5, 6, and 7. A high shrink-swell potential, slow permeability, the seasonal high water table, and the slope are the major limitations. The occasionally flooded soils on flood plains in association 3 are generally unsuitable as sites for dwellings and septic tank absorption fields.

The suitability of the soils in the county for recreational uses is poor to good, depending on the intensity of the use. The soils that are best suited to camp and picnic areas are the gently sloping and sloping soils in associations 5 and 6 and the less sloping soils in association 4 (fig. 5). Soils that are wet and those that are subject to flooding generally are poorly suited to most intensive recreational uses. These soils are most prevalent in associations 1, 2, 3, and 7. The steep and very steep soils in association 4 are limited as sites for many recreational uses. Small areas

of soils that are suitable for intensive recreational development are generally available in all of the associations.

The suitability for wildlife habitat is good throughout the county. Associations 1, 2, 3, 5, 6, and 7 are well suited to openland wildlife habitat. The soils that are best suited to woodland wildlife habitat are those in associations 3, 4, and 5. Some areas in association 3 are moderately suited to certain types of wetland wildlife habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Catlin silty clay loam, 2 to 5 percent slopes, eroded, is a phase of the Catlin series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

In some areas the detailed soil maps of De Witt County do not join with those of Logan, Macon, and Piatt Counties because of differences in the kind of parent material and conceptual differences in soil classification. The soils in these map units are similar and have similar potentials. The differences in the map unit names do not significantly affect the use and behavior of the soils.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

17—Keomah silt loam. This nearly level, somewhat poorly drained soil is on broad ridgetops in the uplands. Individual areas are irregular in shape and range from 4 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is grayish brown, friable silt loam about 7 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is brown, friable silty clay loam. The next part is dark grayish brown and grayish brown, firm silty clay and silty clay loam. The lower part is olive gray, friable silt loam. The underlying material to a depth of 60 inches or more is mottled dark gray and yellowish brown, friable silt loam. In some areas the surface layer is darker. In other areas the slope is more than 2 percent. In places depth to the seasonal high water table is more than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are subject to ponding and are in shallow depressions below the

Keomah soil. They make up 5 to 10 percent of the unit.

Air and water move through the Keomah soil at a slow or moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 2 to 4 feet below the surface during spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and to septic tank absorption fields.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and productivity.

The plants grazed by livestock or harvested for hay grow well on this soil. Subsurface tile drains reduce the wetness. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the slow or moderately slow permeability are limitations. Subsurface tile drains help to lower the water table. Grading and land shaping help to remove excess surface water. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIw.

27D2—Miami loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 5 inches thick. It has been thinned by water erosion. The subsoil is about 47 inches thick. The upper part is yellowish brown and brown, friable clay loam. The lower part is dark yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown, friable, calcareous loam. In some areas, the subsoil is thinner and the underlying material contains more clay and less sand. In other areas the underlying material has carbonates within a depth of 20 inches. In places the surface layer and subsoil contain more silt and less sand. In a few areas the slope is less than 10 percent.

Included with this soil in mapping are small areas of the poorly drained Sawmill and somewhat poorly drained Lawson soils. These soils formed in alluvium in drainageways below the Miami soil. They make up 3 to 8 percent of the unit.

Air and water move through the upper part of the Miami soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay. This soil is poorly suited to cropland and to septic tank absorption fields. It is moderately suited to pasture and hay, to dwellings, and to openland wildlife habitat. It is well suited to woodland and to woodland wildlife habitat.

Establishing pasture plants or hay on this soil helps to keep water erosion within tolerable limits. Timely deferment of grazing helps to prevent surface compaction and excessive runoff. If possible, pasture and hayland should be tilled on the contour when a seedbed is prepared or the pasture is renovated. Applying fertilizer and allowing enough time for the plants to become established before grazing or clipping help to keep the pasture in good condition and help to control water erosion.

The wooded areas of this soil provide good habitat for woodland wildlife. Measures that exclude livestock help to prevent depletion of the shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, squirrels, and a variety of songbirds. Hedges and rows of shrubs provide cover for doves and many songbirds.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-

swell potential and the slope are limitations. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

If the soil is used as a site for septic tank absorption fields, the slope and the moderately slow permeability are limitations. Enlarging the absorption area or replacing the soil with more permeable material helps to overcome the restricted permeability. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

27E—Miami loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes in the uplands. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 5 inches thick. The subsurface layer is yellowish brown, friable loam about 4 inches thick. The subsoil is yellowish brown, friable clay loam about 37 inches thick. The underlying material to a depth of 60 inches or more is brown and yellowish brown, firm, calcareous loam. In some areas, the subsoil is thinner and the underlying material contains more clay. In other areas calcareous till is within a depth of 20 inches. In places the surface layer contains more clay.

Included with this soil in mapping are small areas of the poorly drained Sawmill and somewhat poorly drained Lawson soils. These soils formed in alluvium in drainageways below the Miami soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Miami soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in wooded areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used as woodland. This soil is well suited to woodland and to habitat for woodland wildlife. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the slope.

The plants grazed by livestock or harvested for hay grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to water erosion. Applying fertilizer and allowing enough time for the plants to become established before grazing or clipping help to keep the pasture in good condition and help to control water erosion. If possible, the pasture should be tilled on the contour when a seedbed is prepared or the pasture is renovated.

If this soil is used as woodland, the hazard of water erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used for woodland wildlife habitat, measures that exclude livestock are needed. These measures help to prevent depletion of the shrubs and sprouts that provide food and cover for woodland wildlife, such as deer, squirrels, and a variety of songbirds. Hedges and rows of shrubs provide cover for doves and many songbirds.

The land capability classification is VIe.

27G—Miami silt loam, 30 to 50 percent slopes. This very steep, well drained soil is on side slopes in the uplands. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 5 inches thick. The subsurface layer is brown, friable silt loam about 2 inches thick. The subsoil is about 42 inches thick. The upper part is yellowish brown, friable silt loam. The lower part is brown and dark yellowish brown, mottled, friable and firm loam and clay loam. The underlying material to a depth of 60 inches or more is brown, mottled, calcareous, firm loam. In some areas the subsoil contains less clay and is calcareous within a depth of 20 inches. In other areas the surface layer contains more clay. In places the underlying material contains more sand and clay.

Included with this soil in mapping are small areas of the poorly drained Sawmill and somewhat poorly drained Lawson soils. These soils formed in alluvium in drainageways below the Miami soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Miami soil at at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in

wooded areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for woodland and woodland wildlife habitat. This soil is well suited to woodland and to woodland wildlife habitat. It is moderately suited to pasture. It is generally unsuitable as a site for dwellings and septic tank absorption fields because of the slope.

If this soil is used as woodland, the hazard of water erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The existing stands of trees on this soil provide good habitat for woodland wildlife. Trees and shrubs can be easily established. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food for woodland wildlife.

The land capability classification is VIIe.

36B—Tama silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and low ridges in the uplands. Individual areas are irregular in shape and range from 4 to 300 acres in size.

Typically, the surface layer is black, friable silt loam about 6 inches thick. The subsurface layer also is black, friable silt loam about 6 inches thick. The subsoil is about 35 inches thick. The upper part is brown, friable silty clay loam. The next layer is brown, mottled, friable silty clay loam. The lower part is dark yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, friable silt loam. In some areas the surface layer is lighter in color and contains more clay. In other areas the lower part of the subsoil formed in glacial till.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in shallow depressions below the Tama soil. They make up 5 to 10 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundation and extending the footings below the subsoil or reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

43—Ipava silt loam. This nearly level, somewhat poorly drained soil is on broad ridgetops in the uplands. Individual areas are irregular in shape and range from 4 to 600 acres in size.

Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is about 11 inches of black, friable silt loam and silty clay loam. The subsoil is mottled silty clay loam about 37 inches thick. The upper part is brown, and the lower part is dark grayish brown and grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, friable silt loam. In some areas the subsoil

contains less clay. In other areas depth to the seasonal high water table is more than 3 feet. In places glacial till is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways and depressions below the Ipava soil. They make up 5 to 10 percent of the unit.

Air and water move through the Ipava soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and to septic tank absorption fields.

No major limitations or hazards affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Grading and land shaping help to remove excess surface water. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

45—Denny silt loam. This nearly level, poorly drained soil is in shallow depressions in the uplands. It is occasionally ponded for brief periods in early spring. Individual areas are round or oblong and range from 2 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown and dark grayish brown, mottled, friable silt loam about 11 inches thick. The subsoil is about 35 inches thick. It is mottled. The upper part is grayish brown, firm silty clay loam. The next part is olive gray, firm silty clay. The lower part is light olive gray, friable silty clay loam. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable silt loam. In some areas the subsurface layer is darker. In other areas the underlying material is loamy.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils. These soils are not ponded and are on slight rises above the Denny soil. They make up 1 to 3 percent of the unit.

Air and water move through the Denny soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high. The surface layer can be easily tilled only within a narrow range in moisture content.

Most areas are cultivated. This soil is moderately suited to cultivated crops, pasture, and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains, surface inlets to the tile drains, and surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

If this soil is used for pasture or hay, the ponding is the main hazard. Subsurface tile drains and surface inlets to the tile drains reduce this hazard. Harvesting or grazing during wet periods and overgrazing reduce forage production and cause surface compaction and poor tilth. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

56B2—Dana silt loam, 2 to 6 percent slopes, eroded. This gently sloping, moderately well drained soil is on side slopes on till plains and moraines in the uplands. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is about 8 inches of very dark grayish brown, friable silt loam mixed with yellowish brown silty clay loam. It has been thinned by water erosion. The subsoil is about 39 inches thick. The upper part is yellowish brown, friable silty clay loam.

The next part is yellowish brown, mottled, friable clay loam. The lower part is brown and yellowish brown, mottled, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam. In some places the surface soil is thicker. In other places, the upper part of the subsoil contains more sand and carbonates are closer to the surface. In some areas loamy outwash is mixed with the loam till in the underlying material. In other areas the subsoil contains more silt and less sand. In a few areas slopes are as much as 10 percent.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Ipava soils. These soils are in shallow depressions and drainageways below the Dana soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Dana soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 6 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, water erosion is the main hazard. Deterioration of tilth is a problem. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion. Incorporating crop residue into the soil or adding other organic material can minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume can improve tilth and minimize surface compaction.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. Installing tile lines around the base of the foundation reduces the wetness.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table, such as subsurface tile drains near the perimeter of the absorption field, are needed. Enlarging the absorption field helps to overcome the restricted permeability.

The land capability classification is IIe.

67—Harpster silty clay loam. This nearly level, poorly drained soil is on broad flats and in depressions on outwash plains and till plains. It is occasionally ponded for brief periods in early spring. Individual areas are long and narrow or horseshoe shaped and range from 2 to 40 acres in size.

Typically, the surface layer is black, friable, calcareous silty clay loam about 9 inches thick. The subsurface layer also is black, friable, calcareous silty clay loam. It is about 6 inches thick. The subsoil is olive gray and dark gray, mottled, calcareous, friable and firm silty clay loam about 30 inches thick. The underlying material to a depth of 60 inches or more is mottled olive gray and light olive brown, friable, calcareous silt loam. In some areas the surface layer is not calcareous. In other areas the subsoil contains more sand. In places the soil has no carbonates within a depth of 20 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils. These soils are on slight rises above the Harpster soil. They make up 2 to 6 percent of the unit.

Air and water move through the Harpster soil at a moderate rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is high. Organic matter content also is high. The surface soil is friable, but it is compact and cloddy if it has been plowed when wet. It contains free lime, or carbonates. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains and surface drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. No applications of lime are needed. Keeping tillage at a minimum and returning crop residue to the soil improve

tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.
The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is on broad flats, in depressions, and in shallow drainageways in the uplands. It is occasionally ponded for brief periods in early spring. Individual areas are irregular in shape and range from 5 to 600 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam. In some areas the subsoil contains more clay. In other areas carbonates are within a depth of 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Tama soils. These soils are not ponded and are in the more sloping areas above the Sable soil. They make up 5 to 10 percent of the unit.

Air and water move through the Sable soil at a moderate rate. Surface runoff is slow or ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is high. The surface soil is friable, but it is compact and cloddy if it has been plowed when wet. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil can maintain tilth, minimize surface compaction and crusting, and increase the rate of water intake.

The land capability classification is IIw.

73—Ross loam. This nearly level, well drained soil is on flood plains. It is occasionally flooded for very brief periods from March through May. Individual areas are irregular in shape and range from 10 to 80 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is very dark gray, friable loam about 6 inches thick. The subsoil is very dark grayish brown and brown, friable loam about 23 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable sandy loam. In places the surface soil is thinner and lighter in color. In some areas the surface soil and subsoil contain more sand, and in other areas they contain less sand.

Included with this soil in mapping are small areas of the poorly drained Sawmill and somewhat poorly drained Lawson soils. These soils are lower on the landscape than the Ross soil. They make up 2 to 8 percent of the unit.

Air and water move through the Ross soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential is low, and the potential for frost action is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and woodland. Because it is subject to flooding, it generally is unsuitable as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, dikes or diversions help to reduce the extent of the crop damage caused by floodwater. Planting crops adapted to a shorter growing season and wetter conditions also reduces the extent of this damage. Keeping tillage at a minimum and returning crop residue to the soil help to maintain productivity and tilth.

In the areas used for pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. In the areas used for hay, the flooding delays harvesting during some years.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark gray and gray, mottled, friable and firm silty clay loam about 27 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, friable silty clay loam. In some areas the surface layer is light colored and contains less clay. In other areas it contains more sand. In a few places the surface layer and subsoil contain less clay.

Included with this soil in mapping are small areas of the well drained Ross soils. These soils contain less clay throughout than the Sawmill soil. Also, they are higher on the landscape. They make up 3 to 5 percent of the unit.

Air and water move through the Sawmill soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and woodland. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the seasonal high water table is a limitation. The flooding occurs during the growing season less often than once every 2 years, but it delays planting in some years. Dikes or diversions help to reduce the extent of the crop damage caused by floodwater. The soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting can improve tilth, minimize surface compaction and crusting, and increase the rate of water intake.

If this soil is used as woodland, the equipment limitation, seedling mortality, and the windthrow hazard are management concerns. They are caused by the wetness. Plant competition also is a management concern. It affects the seedlings of desirable species. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

134C2—Camden silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on side slopes on stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed dark grayish brown, very dark grayish brown, and yellowish brown, friable silt loam about 4 inches thick. It has been thinned by water erosion. The subsoil is about 41 inches thick. It is yellowish brown and is friable and firm. The upper part is silty clay loam, and the lower part is loam and sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, stratified sandy loam, loam, and loamy sand. In places the surface layer is darker. In some areas the underlying material is brown sand. In other areas the upper part of the subsoil contains less silt and more sand. In a few places the lower part of the subsoil contains less sand and more silt.

Included with this soil in mapping are small areas of sandy soils that are droughty. These soils are on side slopes below the Camden soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Camden soil at a moderate rate and through the lower part at a moderate or moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings without basements. It is well suited to pasture and hay and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, water erosion is a hazard. A crop rotation that includes 1 year or more of forage crops, a conservation tillage

system that leaves crop residue on the surface after planting, contour farming, and terraces help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity and tilth.

Pasture plants and hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion. Seeding the pasture on the contour also helps to control water erosion.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

138—Shiloh silty clay loam. This nearly level, very poorly drained soil is in shallow depressions on loess-covered outwash plains. It is occasionally ponded for brief periods in early spring. Individual areas are round or oval and range from 2 to 60 acres in size.

Typically, the surface layer is black, firm silty clay loam about 11 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsoil is firm silty clay loam about 37 inches thick. It is mottled. The upper part is very dark gray. The next part is dark gray. The lower part is gray. The underlying material to a depth of 60 inches or more is light gray, mottled, friable silt loam. In places the surface soil is thinner. In some areas the subsoil has a lower content of clay. In other areas the underlying material has a higher content of sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils. These soils are not subject to ponding and are on slight rises above the Shiloh soil. Also included are areas of soils that are ponded for long periods during the growing season. Included soils make up 2 to 5 percent of the unit.

Air and water move through the Shiloh soil at a moderately slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 1 foot above the surface to 2 feet below during spring. Available water capacity is high. Organic matter content also is high. The firm surface soil can be easily tilled only within a narrow range in moisture content. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile drainage, and surface inlet tile drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

In the areas used for pasture and hay, the ponding is a hazard. It can be controlled, however, by surface inlet tile drains, subsurface tile drains, or shallow ditches. Restricted use during wet periods helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

148B2—Proctor silt loam, 2 to 6 percent slopes, eroded. This gently sloping, well drained soil is on ridges, knolls, and side slopes on stream terraces and outwash plains. Individual areas are long and narrow and range from 5 to 50 acres in size.

Typically, the surface layer is mixed very dark grayish brown and brown, friable silt loam about 9 inches thick. It has been thinned by water erosion. The subsoil is about 33 inches thick. The upper part is brown, friable silty clay loam. The lower part is brown and dark yellowish brown, friable clay loam and loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable, stratified sandy loam and loam. In places the surface layer is lighter in color. In some areas the underlying material is calcareous loam till. In other areas the lower part of the subsoil contains less sand.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways below the Proctor soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Proctor soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank

absorption fields. It is moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further water erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

171B2—Catlin silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on side slopes and ridges on till plains and moraines. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface layer is mixed very dark brown and brown, friable silty clay loam about 8 inches thick. It has been thinned by water erosion. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, yellowish brown, and brown, friable silty clay loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown and yellowish brown, friable, calcareous loam. In some areas the surface layer is thicker. In other areas the underlying material is silty. In a few places, the subsoil is thinner and glacial till is closer to the surface.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways below the Catlin soil. They make up 4 to 8 percent of the unit.

Air and water move through the Catlin soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3.5 to 6.0 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Incorporating crop residue into the soil or adding other organic material can minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume can improve tilth and minimize surface compaction.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile lines around the base of the foundation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. The septic system functions better if the water table is lowered or the distribution lines are installed closer to the surface than is typical. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table.

The land capability classification is IIe.

171C2—Catlin silty clay loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes and ridges on till plains and moraines. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is mixed very dark grayish brown and brown, friable silty clay loam about 11 inches thick. It has been thinned by water erosion. The subsoil extends to below a depth of 60 inches. The upper part is brown and yellowish brown, friable silty clay loam. The next part is light olive brown, mottled, firm silty clay loam. The lower part is olive brown, mottled, firm clay loam. In some areas the surface layer is thinner. In other areas the lower part of the subsoil is silty. In a few places, the subsoil is thinner and glacial till is closer to the surface.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained

Ipava soils. These soils are in drainageways below the Catlin soil. They make up 2 to 5 percent of the unit.

Air and water move through the Catlin soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3.5 to 6.0 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A crop rotation that includes 1 year or more of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, minimize crusting, and improve tilth.

The plants grazed by livestock or harvested for hay grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and surface compaction and thus excessive runoff and increased susceptibility to water erosion. Applying fertilizer and allowing enough time for the plants to become established before grazing or clipping help to keep the pasture in good condition and help to control water erosion. If possible, the pasture should be tilled on the contour when a seedbed is prepared or the pasture is renovated.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile lines around the base of the foundation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. The septic system functions better if the water table is lowered or the distribution lines are installed closer to the surface than is typical. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table.

The land capability classification is IIIe.

198—Elburn silt loam. This nearly level, somewhat poorly drained soil is on slight rises on outwash plains and stream terraces. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 42 inches thick. It is brown, mottled, and friable. The upper part is silt loam and silty clay loam. The next part is silt loam. The lower part is stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silty loam and sandy loam. In some areas the surface layer is thinner. In other areas the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Plano and poorly drained Sable soils. Plano soils are on slight rises above the Elburn soil. Sable soils are in drainageways and depressions below the Elburn soil. Included soils make up 2 to 10 percent of the unit.

Air and water move through the upper part of the Elburn soil at a moderate rate and through the lower part at a moderate or moderately rapid rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface drainage tile around the foundation helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by underground tile drains. Grading and land shaping help to remove excess surface water.

The land capability classification is I.

199A—Plano silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on broad ridges on outwash plains and stream terraces. Individual areas

are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark brown, brown, and dark yellowish brown silty clay loam. The next part is dark yellowish brown silt loam. The lower part is brown and dark yellowish brown, stratified sandy loam, loam, and silt loam. In some areas the lower part of the subsoil is loamy glacial till. In other areas it contains less sand.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Elburn soils. These soils are in drainageways or on broad flats below the Plano soil. They make up 5 to 10 percent of the unit.

Air and water move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

No major limitations affect the use of this soil for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

199B2—Plano silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on ridges and side slopes on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is brown, yellowish brown, and dark yellowish brown silty clay loam. The lower part is yellowish brown loam. In places the surface layer is thicker. In some areas the lower part of the subsoil is loam till. In other areas it is loess.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Elburn soils. These soils are in shallow depressions and drainageways below the Plano soil. They make up 2 to 5 percent of the unit.

Air and water move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion. Incorporating crop residue into the soil or adding other organic material can minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume can improve tilth and minimize surface compaction.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

206—Thorp silt loam. This nearly level, poorly drained soil is in shallow depressions on outwash plains and stream terraces. It is occasionally ponded for brief periods in early spring. Individual areas are round or oblong and range from 2 to 10 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 41 inches thick. It is mottled. The upper part is olive gray, dark gray, and gray, friable and firm silty clay loam. The lower part is light olive gray, friable, stratified silt loam and loam. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable loam. In some areas the surface layer is thinner. In other areas the surface layer and subsurface layer are silty clay loam.

Included with this soil in mapping are small areas of

the somewhat poorly drained Elburn and Ipava soils. These soils are not ponded and are on slight rises above the Thorp soil. They make up 1 to 3 percent of the unit.

Air and water move through the Thorp soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is moderate. The surface layer can be easily tilled only within a narrow range in moisture content. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains, surface inlets to the tile drains, and surface drains generally function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

If this soil is used for pasture or hay, the ponding is the main hazard. Subsurface tile drains and surface inlets to the tile drains reduce this hazard. Harvesting or grazing during wet periods and overgrazing reduce forage production and cause surface compaction and poor tilth. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

221C2—Parr silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on knolls and side slopes on moraines and till plains. Individual areas are irregular in shape and range from 4 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 8 inches thick. It has been thinned by water erosion. The subsoil is about 31 inches thick. It is friable. The upper part is dark yellowish brown silty clay loam. The lower part is dark yellowish brown and yellowish brown clay loam and loam. The underlying material to a depth of 60 inches or more is yellowish brown, firm, calcareous loam. In places the surface layer contains more clay. In some areas the lower part of the subsoil contains less sand and more silt.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways below the Parr soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Parr soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A crop rotation in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, minimize crusting, and improve tilth.

Establishing pasture plants or hay on this soil helps to keep water erosion within tolerable limits. Overgrazing, however, reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion. If possible, the pasture should be tilled on the contour when a seedbed is prepared or the pasture is renovated.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If the soil is used as a site for septic tank absorption fields, the moderately slow permeability is a limitation. It can be overcome by enlarging the absorption area.

The land capability classification is IIIe.

233B—Birkbeck silt loam, 1 to 4 percent slopes. This gently sloping, moderately well drained soil is on ridgetops in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is brown, friable silt loam about 3 inches thick. The subsurface layer also is

brown, friable silt loam. It is about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, mottled, friable and firm silt loam and silty clay loam. The lower part is yellowish brown, mottled, friable loam. In some places the lower part of the subsoil contains less sand. In other places it contains more sand.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in shallow depressions and drainageways below the Birkbeck soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Birkbeck soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 6 feet below the surface during spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile drains around the base of the foundation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. The septic system functions better if the water table is lowered or the distribution lines are installed closer to the surface than is typical. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table.

The land capability classification is IIe.

233C2—Birkbeck silt loam, 4 to 8 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, friable silt loam about 6 inches thick. It has been thinned by water erosion. The subsoil extends to a depth of more than 60 inches. It is mottled and friable. The upper part is brown and dark yellowish brown silty clay loam. The next part is yellowish brown and grayish brown silt loam. The lower part is yellowish brown loam. In some places the lower part of the subsoil contains less sand and more silt. In other places, the subsoil is thinner and glacial till is within a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways below the Birkbeck soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Birkbeck soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 6 feet below the surface during spring. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to pasture, hay, and woodland. It is moderately suited to cultivated crops and to dwellings. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further water erosion is the main hazard. A crop rotation that includes 1 year or more of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

The plants grazed by livestock or harvested for hay grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to water erosion. Applying fertilizer and allowing enough time for the plants to become established before grazing or clipping help to keep the pasture in good condition and help to control water erosion. Seeding the pasture on the contour also helps to control water erosion.

If this soil is used as woodland, plant competition is a

management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. If the soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table.

The land capability classification is IIIe.

243B—St. Charles silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 45 inches thick. The upper part is brown and dark yellowish brown, friable and firm silty clay loam. The lower part is dark yellowish brown, firm silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable, stratified loam and sandy loam. In a few places the surface layer is darker. In some areas the loamy outwash is closer to the surface.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils. These soils are on flood plains below the St. Charles soil. They make up 5 to 8 percent of the unit.

Air and water move through the St. Charles soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to dwellings and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion. Returning crop residue to the soil or regularly adding other organic material helps to maintain productivity and tilth and increases the rate of water intake.

Establishing pasture plants or hay on this soil helps to control water erosion. Overgrazing, however, reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the moderate permeability is a limitation. It can be overcome by enlarging the absorption area.

The land capability classification is IIe.

244—Hartsburg silty clay loam. This nearly level, poorly drained soil is on broad flats on outwash plains and till plains. It is occasionally ponded for brief periods in early spring. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 5 inches thick. The subsoil is about 25 inches thick. It is mottled and friable. The upper part is dark gray silty clay loam. The lower part is olive gray and gray, calcareous silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is olive gray, mottled, calcareous, friable silt loam. In some areas the subsoil is not calcareous. In other areas the subsurface layer is thicker.

Included with this soil in mapping are small areas of the moderately well drained Catlin and somewhat poorly drained Ipava soils. These soils are on slight rises above the Hartsburg soil. They make up 2 to 4 percent of the unit.

Air and water move through the Hartsburg soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is high. The surface soil can be easily tilled only within a narrow range in moisture content. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

The land capability classification is IIw.

279B—Rozetta silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is predominantly on ridgetops in the uplands, but a few areas are on toe slopes and stream terraces near the major drainageways. Individual areas are irregular in shape and range from 4 to 200 acres in size.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer also is brown, friable silt loam about 5 inches thick. The subsoil is about 43 inches thick. It is friable. The upper part is dark yellowish brown and yellowish brown silty clay loam. The lower part is brown, mottled silt loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silt loam. In some areas the surface layer is darker. In other areas the underlying material is loam till.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways and on flats below the Rozetta soil. They make up 2 to 10 percent of the unit.

Air and water move through the Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. If the soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Installing subsurface tile drains near the foundation lowers the water table. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains lowers the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is IIe.

322C2—Russell silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown, friable silt loam about 6 inches thick. It has been thinned by water erosion. The subsoil is about 38 inches thick. The upper part is dark yellowish brown and yellowish brown, friable and firm silty clay loam. The lower part is brown and dark yellowish brown, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm clay loam. In some areas, the subsoil is thinner and the underlying material is closer to the surface. In a few areas the surface layer is darker. In places, the subsoil is thicker and the underlying material is silty.

Included with this soil in mapping are small areas of

the poorly drained Sable soils. These soils are in depressions and drainageways below the Russell soil. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the Russell soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings and septic tank absorption fields. It is well suited to pasture and hay.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. A crop rotation in which forage crops are grown for 1 year or more, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material improve productivity and tilth.

Establishing pasture plants or hay on this soil helps to keep water erosion within tolerable limits. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the moderate permeability is a limitation. It can be overcome by enlarging the absorption area.

The land capability classification is IIIe.

322D3—Russell silty clay loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes in the uplands. In most areas, nearly all of the original surface layer has been removed by water erosion and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, friable silty clay loam about 3 inches thick. The subsoil is about 44 inches thick. The upper part is yellowish brown, friable and firm silty clay loam. The lower part is yellowish brown, friable clay loam and loam. The underlying material to a depth of 60 inches or more is dark yellowish brown and yellowish brown, firm loam. In some areas, the subsoil is thinner and the underlying material is closer to the surface. In a few places the surface layer is thicker and contains less clay.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Keomah soils. These soils are in depressions and drainageways below the Russell soil. They make up 5 to 8 percent of the unit.

Air and water move through the upper part of the Russell soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content is very low. The surface layer tends to puddle and crust after hard rains because water erosion has removed most of the original surface layer and the plow layer is mostly subsoil material. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil generally is unsuited to cultivated crops because of a severe hazard of water erosion. It is moderately suited to pasture and hay and to dwellings and septic tank absorption fields. It is well suited to woodland.

Establishing pasture plants or hay on this soil helps to control water erosion. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage and in controlling further water erosion. Allowing enough time for the plants to become established before grazing or clipping helps to maintain a good stand of forage. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. Reinforcing the foundation or extending the footings below the

subsoil helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Enlarging the absorption area helps to overcome the restricted permeability. Installing the filter lines on the contour or cutting and filling help to overcome the slope.

The land capability classification is VIe.

330—Peotone silty clay loam. This nearly level, very poorly drained soil is in shallow depressions on till plains. It is occasionally ponded for brief periods in early spring. Individual areas are round or oval and range from 3 to 80 acres in size.

Typically, the surface soil is black, friable silty clay loam about 22 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark gray, very dark gray, and gray, mottled silty clay loam. The lower part is light gray, mottled silt loam. In places the surface soil is thinner. In some areas the surface soil and subsoil contain less clay. In other areas the underlying material contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and Ipava soils. These soils are on slight rises above the Peotone soil. Also included are areas of soils that are ponded for long periods during the growing season. Included soils make up 2 to 5 percent of the unit.

Air and water move through the Peotone soil at a moderately slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 1.0 foot below during spring. Available water capacity is high. Organic matter content also is high. The surface soil can be easily tilled only within a narrow range in moisture content. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile drainage, and surface inlet tile drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

In the areas used for pasture and hay, the ponding is a hazard. It can be controlled, however, by surface inlet tile drains, subsurface tile drains, or shallow ditches. Restricted use during wet periods helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

415—Orion silt loam. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods from March through May. Individual areas are fan shaped or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The next layer extends to a buried soil at a depth of about 38 inches. It is brown, mottled, friable silt loam. The buried soil is very dark gray and black, mottled, friable silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown, mottled, friable, stratified silt loam and loam. In places the buried soil is below a depth of 40 inches. In some areas the surface layer is darker.

Included with this soil in mapping are small areas of the well drained Ross and poorly drained Sawmill soils. Ross soils are nearer the streams and are slightly higher on the landscape than the Orion soil. Sawmill soils are in old oxbows below the Orion soil. Included soils make up 2 to 5 percent of the unit.

Air and water move through the Orion soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture, hay, and woodland. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the seasonal high water table is a limitation. The flooding generally occurs during the growing season less frequently than once every 2 years, but it delays planting in some years. Dikes or diversions help to reduce the extent of the crop damage caused by floodwater. Planting corn, soybeans, or small grain varieties adapted to a shorter growing season and wetter conditions also reduces the extent of this damage. Subsurface tile drains function

satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for pasture or hay, the flooding is a hazard. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. In the areas used for hay, the flooding delays harvesting during some years.

If this soil is used as woodland, the equipment limitation is a management concern. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

451—Lawson silt loam. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 8 to 200 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is about 27 inches of black, friable silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown and dark gray, mottled, friable silty clay loam. In some areas the dark subsurface layer is thinner.

Included with this soil in mapping are small areas of the well drained Ross soils. These soils are on low ridges that are higher on the flood plains than the Lawson soil. They make up 5 to 8 percent of the unit.

Air and water move through the Lawson soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the seasonal high water table is a limitation. The flooding delays planting in some years. Dikes or diversions help to reduce the extent of the crop damage caused by floodwater. Planting corn, soybeans, or small grain varieties adapted to a shorter growing season and wetter conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain productivity and tilth.

If this soil is used for pasture and hay, the flooding is a hazard. Dikes or diversions help to control the flooding. Subsurface tile drains lower the water table. Overgrazing causes surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. In the areas used for hay, the flooding delays harvesting in some years.

The land capability classification is IIw.

533—Urban land. This map unit occurs as areas covered by pavement and buildings. Because of extensive land smoothing, it generally is nearly level and gently sloping. Individual areas range from 5 to 160 acres in size. They are commonly square or rectangular, but some are long and narrow.

More than 85 percent of this map unit is covered by buildings and pavement. Most of the paved areas are parking lots adjacent to shopping areas, industrial parks, commercial buildings, and the power plant at Clinton Lake.

Included in this unit in mapping are small areas of Sable and Ipava soils and Orthents. The poorly drained Sable and somewhat poorly drained Ipava soils are in slight depressions and drainageways in undisturbed areas. Orthents are moderately fine textured to moderately coarse textured soils that have been modified by urban development. Included soils make up less than 10 percent of the unit.

Runoff generally is very rapid on the Urban land. Because of the design of most paved areas, the water commonly is diverted to storm drainage systems. In some areas, however, it is diverted to the adjacent soils. The additional runoff increases the susceptibility to water erosion.

The vegetation is mainly grasses at the border of the urban areas and widely spaced trees and shrubs.

Weeds and grasses grow in a few idle areas at the edge of built-up land. Special management is needed when trees and shrubs are planted and after they are established. Periodic supplemental watering is needed in some areas. Red maple, silver maple, hackberry, green ash, and sycamore can be planted along streets.

This unit is not assigned a land capability classification.

683—Lawndale silt loam. This nearly level, somewhat poorly drained soil is on outwash plains in the uplands. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 14 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable and mottled. The upper part is brown silty clay loam. The next part is olive brown silty clay loam and silt loam. The lower part is dark yellowish brown loamy fine sand. In some areas the lower part of the subsoil is silty.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in shallow depressions and on flats below the Lawndale soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Lawndale soil at a moderate rate and through the lower part at a moderately rapid and rapid rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundation helps to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table. Grading and land shaping help to remove excess surface water.

The land capability classification is I.

684B—Broadwell silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains in the uplands. Individual areas are long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, friable silt loam. The lower part is dark yellowish brown and yellowish brown, loose loamy fine sand and fine sand. In some places the underlying material contains less sand and more silt. In other places the surface layer contains more clay. In a few areas the lower part of the subsoil is silty.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawndale soils. These soils are in drainageways and slight depressions below the Broadwell soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Broadwell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

In the areas used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

802B—Orthents, loamy, gently sloping. These somewhat poorly drained and moderately well drained, moderately fine textured soils are mostly in cut and fill areas in the uplands. The landscape has been leveled. Individual areas are rectangular or irregular in shape and range from 5 to 100 acres in size.

Typically, these soils consist of soil material underlain by rocks, concrete, bricks, organic waste, and similar material. In some areas the altered material is deposited on unaltered natural soils.

Included with these soils in mapping are some urban areas and some borrow areas. Also included are a few sloping or strongly sloping areas. Included areas make up 2 to 6 percent of the unit.

Air and water move through the Orthents at a moderate to moderately slow rate. Surface runoff is slow or medium. The seasonal high water table is 1 to 6 feet below the surface during spring. Available water capacity is moderate. The shrink-swell potential is moderate or high, and the potential for frost action is moderate.

Most areas are near the power plant at Clinton Lake. Other areas are near roadways or commercial buildings. These soils are moderately suited to picnic areas and playgrounds. They are poorly suited to dwellings, local roads and streets, and septic tank absorption fields.

The seasonal high water table and the shrink-swell potential are the main limitations if these soils are used as sites for dwellings. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. Low strength, the moderate potential for frost action, and the shrink-swell potential are limitations on sites for local roads and streets. These limitations can be overcome by strengthening or replacing the base material. Removing excess water can minimize the damage caused by frost action and by shrinking and swelling. The water can be removed by grading and shaping the roadway and by ditching and banking the roadsides.

The seasonal high water table is the main limitation if these soils are used for playgrounds or picnic areas. Subsurface tile drainage helps to lower the water table.

This map unit is not assigned a land capability classification.

802D—Orthents, loamy, strongly sloping. These moderately fine textured to moderately coarse textured, moderately well drained soils have been modified by filling and leveling. Individual areas are irregular in shape and range from 5 to more than 20 acres in size.

Typically, the loamy material has been deposited, removed, or shaped in fill areas surrounding the Clinton Power Station, along railroad beds and roadways, and in revegetated gravel pits and fill areas. Soil borings indicate that the soil material does not occur in a consistent pattern. A few areas are nearly level or gently sloping.

Included with these soils in mapping are gravel pits and urban areas. Also included are a few areas of Miami soils near the borders of the unit. Included areas make up 2 to 10 percent of the unit.

Available water capacity varies in the Orthents but generally is moderate. Permeability also varies because the soils have been compacted by construction equipment and because the texture varies. The content of organic matter and plant nutrients generally is moderate.

Most of the acreage is idle land. A few areas are developed for nonfarm uses. Unless a good plant cover protects the surface, water erosion is a severe hazard. It is especially severe in the more sloping areas. In severely eroded areas, special management is needed to establish and maintain a plant cover that controls runoff and water erosion. Newly exposed areas lack a plant cover, but some developed areas have a good cover of sod. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas for urban uses.

This map unit is not assigned a land capability classification.

865—Pits, gravel. This map unit consists of excavations from which sand and gravel have been or are being removed. Piles of sand and gravel and other spoil material are within and around the excavations. Individual areas are irregularly shaped or round and range from less than 2 acres to 20 acres in size.

Included in this unit in mapping are some small areas of natural soils on haulage roads or lanes. These soils make up less than 10 percent of the unit.

Air and water move through the soil material at a rapid rate. Surface runoff is slow to rapid. Ponding occurs on the bottom of the excavations. Available water capacity is very low. Organic matter content also is very low.

Some of the abandoned pits that contain water are used for fishing or swimming. They are suited to some recreational activities, including boating, fishing, and swimming. They also are suited to habitat for waterfowl. Camping and hiking are possible in the surrounding areas. The pits containing no water are suited to hiking trails. They also are suited to openland wildlife habitat if

sufficient soil material can be spread over the area to allow for plant growth. Reclamation through grading, shaping, and filling is possible, especially in the smaller pits. It increases the number of uses that can be made of the area. The feasibility and extent of reclamation depend on the desired alternative uses and individual site conditions.

This unit is not assigned a land capability classification.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 223,395 acres in De Witt County, or nearly 87 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for cultivated crops, which account for most of the local farm income each year. Scattered areas of this land are throughout the county, mainly in associations 1, 2, 3, 6, and 7, which are described under the heading "General Soil Map Units."

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in De Witt County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table qualify for prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not this limitation has been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on water erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 204,617 acres in De Witt County, or about 80 percent of the total acreage, was pasture or cropland in 1982 *(13)*. Of this acreage, 196,163 acres was used for corn or soybeans, 2,295 acres for hay, 3,968 acres for pasture, and 1,714 acres for winter wheat.

The potential of the soils in De Witt County for increased food production is fair or poor. Most of the land that is not used for cultivated crops is highly susceptible to water erosion or is subject to flooding. A few of the wooded areas are suitable for row crop production, and some of these areas are being cleared for this purpose every year. Food production could be increased by extending the latest crop production technology to all of the cropland in the county. This soil survey can greatly facilitate the application of such technology. The paragraphs that follow describe the major management concerns in the areas of cropland and pasture in the county.

Water erosion is a hazard on about 67 percent of the pasture and cropland in the county. It is a hazard if the slope is more than 1 percent. Birkbeck, Catlin, Dana, and Tama are the major soils in areas of cropland that are subject to water erosion.

Loss of the surface layer through water erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. The surface layer contains most of the chemically active organic matter in

the soil. Loss of the surface layer is especially damaging to soils in areas where part or all of the subsoil formed in glacial till, such as Dana, Miami, Parr, and Russell soils. The second reason that loss of the surface layer is damaging is that it results in the sedimentation of streams and lakes. Control of water erosion minimizes this pollution and improves the quality of water available for municipal use, for recreation, and for fish and wildlife.

Measures that control water provide a protective surface cover, increase the rate of water infiltration, and thus help to control runoff. A cropping system that keeps a plant cover on the soil for extended periods reduces the hazard of water erosion and preserves the productive capacity of the soils. On livestock farms, which require pasture and hay, including grasses and legumes in the crop rotation helps to control water erosion in sloping areas, provides nitrogen to the crop, and improves tilth for the following crop.

A conservation tillage system that leaves crop residue on the surface after planting is very effective in controlling water erosion. This tillage method creates a rough surface that is partially covered with crop residue. The residue protects the surface from the beating action of raindrops, minimizes surface crusting, and provides a more friable seedbed for good seed germination. As tilth improves, the rate of water infiltration is increased and the runoff rate and hazard of water erosion are reduced.

One system of conservation tillage used in De Witt County is chisel tillage. Where this system is applied, crop residue covers 20 to 60 percent, depending on the type of chisel plow used, the speed of the plow, and the type of crop residue. Chiseling often follows stalk chopping in the fall, but it also can be used immediately prior to planting in the spring.

Another conservation tillage system used in the county is no-till farming. Where this system is applied, a grain crop, generally corn, is planted directly in an existing cover crop, sod, or crop residue. A special planter is used. Herbicides are used to control competing vegetation. This system helps to control water erosion because of the nearly complete ground cover. The only area that is disturbed is the area of the seed row. Thus, the soil is held in place and is not affected by the beating action of raindrops or by water flowing over the surface.

Ridge-till is a newer system of conservation tillage that is used in a few areas of the county. Where this system is applied, the crop is planted on ridges 6 to 10 inches high. The ridges were created by a special tillage tool during the previous cropping year. They dry faster in spring and allow for more rapid seed germination than is typical in areas where conventional tillage methods are applied. If constructed on the contour, the ridges obstruct waterflow and thus help to prevent excessive runoff and water erosion.

Terraces and contour farming also are effective in controlling erosion. The terraces used in De Witt County are generally parallel tile outlet terraces. These terraces allow for the use of equipment with various row widths and eliminate bothersome point rows. Terraces help to control water erosion by shortening the length of slopes. Water collects behind the terraces and is disposed of through underground tile at a controlled rate. Contour farming helps to control water erosion by creating small ridges that are perpendicular to the slope of the land, thereby greatly reducing the amount and velocity of the water moving down the slope.

Erosion-control measures are effective alone or in combination on most of the farmland in De Witt County. The combination used and its effectiveness depend on soil characteristics and topography. Information about the design and applicability of the erosion-control measures is available in the local office of the Soil Conservation Service.

Soil blowing is a hazard on soils having a surface layer that is silt loam or is coarser textured. Soil blowing can occur on these soils in winter and spring, when the surface layer is dry and the surface is bare. Mulching, maintaining a good plant cover, or applying tillage methods that keep the surface rough minimizes the hazard of soil blowing. Field windbreaks also help to control soil blowing.

Soil tilth is a management concern on many of the soils in the county. It affects seed germination and the infiltration of water. Some of the soils in De Witt County have a surface layer that has a low or moderately low organic matter content. Generally, the structure of such soils is weakened by tillage. After periods of heavy rainfall, a crust forms on the surface of these soils. The crust is hard when dry and is nearly impervious to water. Thus, it reduces the rate of water infiltration and increases the runoff rate and the hazard of water erosion. The crust can even be hard enough to inhibit the germination and proper growth of seedlings. It is most likely to form on Birkbeck, Keomah, Russell, and St. Charles soils. Regular additions of crop residue, manure, and other organic material improve soil structure and minimize crusting. A conservation tillage system that leaves crop residue on the surface after planting also helps to prevent the formation of a crust.

Deterioration of tilth also can be a problem on the poorly drained or very poorly drained, dark Harpster,

Figure 6.—An area of Keomah and Sable soils, which are wet early in spring.

Hartsburg, Peotone, Sable, Sawmill, and Shiloh soils. These soils have a surface layer of silty clay loam. They stay wet until late in spring. If they are tilled when wet, they tend to be very cloddy when dry. Because of the cloddiness, preparing a good seedbed is difficult.

In some sloping areas, poor tilth is a management concern because of the loss of the original friable surface layer. Preparing a good seedbed and tilling are difficult because the present plow layer is partly or mostly subsoil material that has a higher content of clay than the original surface layer. These areas tend to be cloddy when tilled and slippery when wet. They are on knolls and ridges throughout the county.

Poor tilth also is a problem on soils that have a plowpan in the lower part of the surface layer. This pan can form in soils that have a surface layer of silt loam or silty clay loam. It reduces the rate at which water moves downward through the soil. Because of the impeded drainage, the runoff rate and the hazard of water erosion can be increased in sloping areas and the soils stay wetter longer in spring.

Wetness is a management concern on much of the acreage used for crops and pasture in the county (fig. 6). In most areas tile drainage systems have been installed, but many systems are old and should be replaced.

Some soils are naturally so wet that the production of crops generally is not possible unless a drainage system is installed. These are the poorly drained or very poorly drained Harpster, Hartsburg, Peotone,

Sable, Sawmill, and Thorp soils. Most areas of these soils have been drained.

Unless drained, the somewhat poorly drained soils are generally wet enough for planting to be delayed in some years. Elburn, Ipava, Keomah, Lawndale, Lawson, and Orion soils are examples.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of outlets. In some areas of the very poorly drained and poorly drained soils in depressions, a combination of surface drains, tile drains, and surface inlets to underground tile drains may be needed. The tile should be more closely spaced in the soils that have a less permeable subsoil. Information about drainage systems is available in local offices of the Soil Conservation Service and the Cooperative Extension Service.

Flooding by stream overflow is a hazard on Lawson, Orion, Ross, and Sawmill soils. Generally, these soils are flooded during the growing season less frequently than once every 2 years. Levees help to protect the soils. Planting crops that are adapted to a shorter growing season and wetter conditions reduces the extent of the crop damage caused by floodwater.

Soil fertility varies in the soils in De Witt County. The light-colored soils on uplands, such as Birkbeck, Keomah, and Rozetta soils, are more acid in the subsoil and less fertile than the dark Catlin, Ipava, Sable, and Tama soils. The soils on flood plains, such as Lawson, Orion, Ross, and Sawmill soils, are neutral or mildly alkaline throughout and are naturally high in content of plant nutrients. Dana, Parr, and other moderately eroded or severely eroded soils, which have lost most or all of their nutrient-rich topsoil, are less fertile than uneroded or slightly eroded soils.

Most of the light-colored soils on uplands are naturally acid. Periodic applications of lime are needed to maintain high yields on these soils. They also are needed on dark soils that become acid because of farming and the application of certain fertilizers.

The level of natural phosphorus in the soils on uplands is medium *(4)*. The ability of the soils to supply phosphorus to the crop varies, depending on the natural drainage class. The better drained soils have a higher level of available phosphorus in the subsoil and underlying material than the more poorly drained soils. The potassium level in the soils in De Witt County is generally high *(4)*. The content of available potassium depends on individual soil characteristics. On all soils the amount of lime and fertilizer to be applied should be based on the results of soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

The field crops suited to the soils and climate of the survey area include many that are not commonly grown. Corn and soybeans are the major row crops. Winter wheat and oats are the most common close-growing crops. Forage crops include smooth bromegrass, orchardgrass, Kentucky bluegrass, alfalfa, and red clover.

Most of the well drained and moderately well drained soils in De Witt County are suitable for vegetable and nursery plants. Soils in low areas, where frost is frequent and air drainage is poor, generally are poorly suited to early vegetables and small fruits.

In the section "Detailed Soil Map Units," the suitability of the soils for cultivated crops and pasture is indicated. Soils that are described as well suited to corn, soybeans, and small grain are in land capability classes I and II; those that are moderately suited are in class III; those that are poorly suited are in class IV; and those that are unsuited are in classes VI and VII.

The soils that are well suited to pasture and hay have animal-unit-month ratings (AUM) of more than 7. An animal-unit-month is the amount of forage needed to maintain one cow, one horse, one mule, five sheep, or five goats for 30 days. A rating of more than 7 indicates that the soil can meet the requirements for more than 7 such animal units. Generally, these soils are well drained to poorly drained and are not persistently wet. They have enough available water to support the forage crop throughout the summer. Slopes vary but generally range from 0 to 10 percent.

Soils that are moderately suited to pasture and hay have AUM ratings of 3 to 7. These soils are in nearly level areas that are so persistently wet that forage production is inhibited, or they are in areas where the slope is a management concern.

Soils that are poorly suited to pasture and hay have AUM ratings of less than 3. These soils tend to be quite steep and have a restricted available water capacity during the summer. Also, seeding, harvesting, and maintaining forage crops are difficult because of the slope.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(6)*. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, control of water erosion, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(10)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of water erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

In 1982, De Witt County had about 3,769 acres of woodland *(13)*. The largest areas of woodland are in associations 3, 4, and 5, which are described under the heading "General Soil Map Units." Since early

settlement, much of the original woodland has been cleared for the production of row crops. Much of the remaining woodland is in areas that are too steep, too wet, or too isolated for row crops. Each year, some land is cleared, generally in parcels as large as several acres and as small as one-quarter of an acre.

Many of the steeper areas are subject to severe water erosion after they are cleared. The timber canopy and the accumulation of leaf litter on the surface provides very effective protection from the erosion caused by the impact of raindrops and by water flowing over the surface. Once this cover is removed, extensive water erosion is possible. In some of the strongly sloping areas that are cleared for farming, water erosion is a severe hazard. As a result, these areas are better suited to timber than to row crops.

Harvesting on private land generally occurs on steep or very steep soils, such as on Miami soils, or wet soils on flood plains, such as on Lawson and Sawmill soils. Selective cutting of white oak, hickory, ash, and walnut for sawlogs is the most common harvesting practice. Some softwood trees are harvested for pulpwood.

The most common trees in the uplands are white oak, northern red oak, shagbark hickory, white ash, green ash, sugar maple, silver maple, boxelder, walnut, and American elm. The most common trees on bottom land are cottonwood, sycamore, willow, pin oak, and silver maple.

Many of the existing timber stands can be improved by thinning out mature trees and trees of low value. Protection from fire and grazing is essential. Logging trails and access roads commonly are on steep soils. Because of the hazard of water erosion, they should be shaped, seeded, and fertilized immediately after harvest. Properly shaped and constructed water bars across logging trails also are needed to control water erosion. Interplanting is needed for maximum woodland production. Control of competing vegetation is needed if seedlings are planted. A cover of grasses between rows of seedlings is necessary if the seedlings are planted in bare, sloping areas.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excessive water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 8, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality

are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Many farmsteads in De Witt County are in nearly level or gently sloping areas that support few trees. Birkbeck, Catlin, Ipava, Sable, and Tama are examples of soils in these areas. If careful consideration is given to species selection, location, site preparation, planting technique, spacing, and maintenance, windbreaks can be established in these areas (fig. 7). The most common trees and shrubs grown as windbreaks are northern whitecedar, eastern white pine, Norway spruce, Amur honeysuckle, gray dogwood, flowering dogwood, Russian olive, silky dogwood, eastern cottonwood, and pin oak.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of both low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 9 shows the height that locally grown trees and shrubs are predicted to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

De Witt County has areas of scenic and historic interest. Public lands available for recreation include Weldon Springs State Park and Mascoutin State Recreation Area and other areas around Clinton Lake. These areas are used for hunting, fishing, canoeing, boating, waterskiing, swimming, hiking, camping, picnicking, and observing wildlife. Several private sportsmen's clubs and private recreational and camping areas are used for hiking, fishing, boating, hunting, and camping.

Figure 7.—A windbreak on a farmstead in De Witt County.

The demand for recreational facilities has increased greatly in the past several years. The potential for the development of additional facilities is good in areas of associations 4 and 5, which are described in the section "General Soil Map Units." These areas are characterized by rolling terrain and wooded slopes. They have good potential for the development of small ponds.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil

properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Steve Brady, state wildlife biologist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain

and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include owls, thrushes, woodpeckers, opossum, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas (fig. 8). Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, and beaver.

In the following paragraphs, the associations described in the section "General Soil Map Units" are grouped into two wildlife areas, which provide different kinds of habitat for wildlife.

Wildlife area 1 consists of the Ipava-Sable-Tama, Plano-Elburn-Sable, Sawmill-Lawson, Catlin-Dana, and Sable-Ipava-Catlin associations. The soils in these associations are nearly level to sloping and are poorly drained to well drained. The Sawmill-Lawson association is occasionally flooded. Most of this wildlife area is used for crops, primarily corn and soybeans. Moldboard plows are used in the fall on many of the soils.

The wildlife habitat in this area is generally poor because of a scarcity of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes. Measures that can improve the habitat include delaying mowing of roadsides, waterways, and other areas until August, when nesting is complete; growing fine-stemmed grasses, such as redtop, timothy, and smooth bromegrass, rather than tall fescue in waterways and on roadsides; allowing fence rows to be overgrown with woody cover and brush; protecting the woody cover and native vegetation along drainageways and streams; planting turn strips of grasses around crop fields and thus eliminating end rows; leaving crop residue untilled throughout the winter; and leaving ¼-acre food plots of grain unharvested in each 40-acre field.

Wildlife area 2 consists of the Miami and Birkbeck-Russell-Keomah associations. The soils in these associations are nearly level to very steep and are somewhat poorly drained to well drained. This area borders the major stream valleys in the county and has a more diversified pattern of land use than wildlife area 1. It consists of cropland, pasture, and woodland. This diverse habitat favors a variety of wildlife. Nongame species include those that inhabit areas of brushy cover and woodland as well as the openland species that inhabit wildlife area 1.

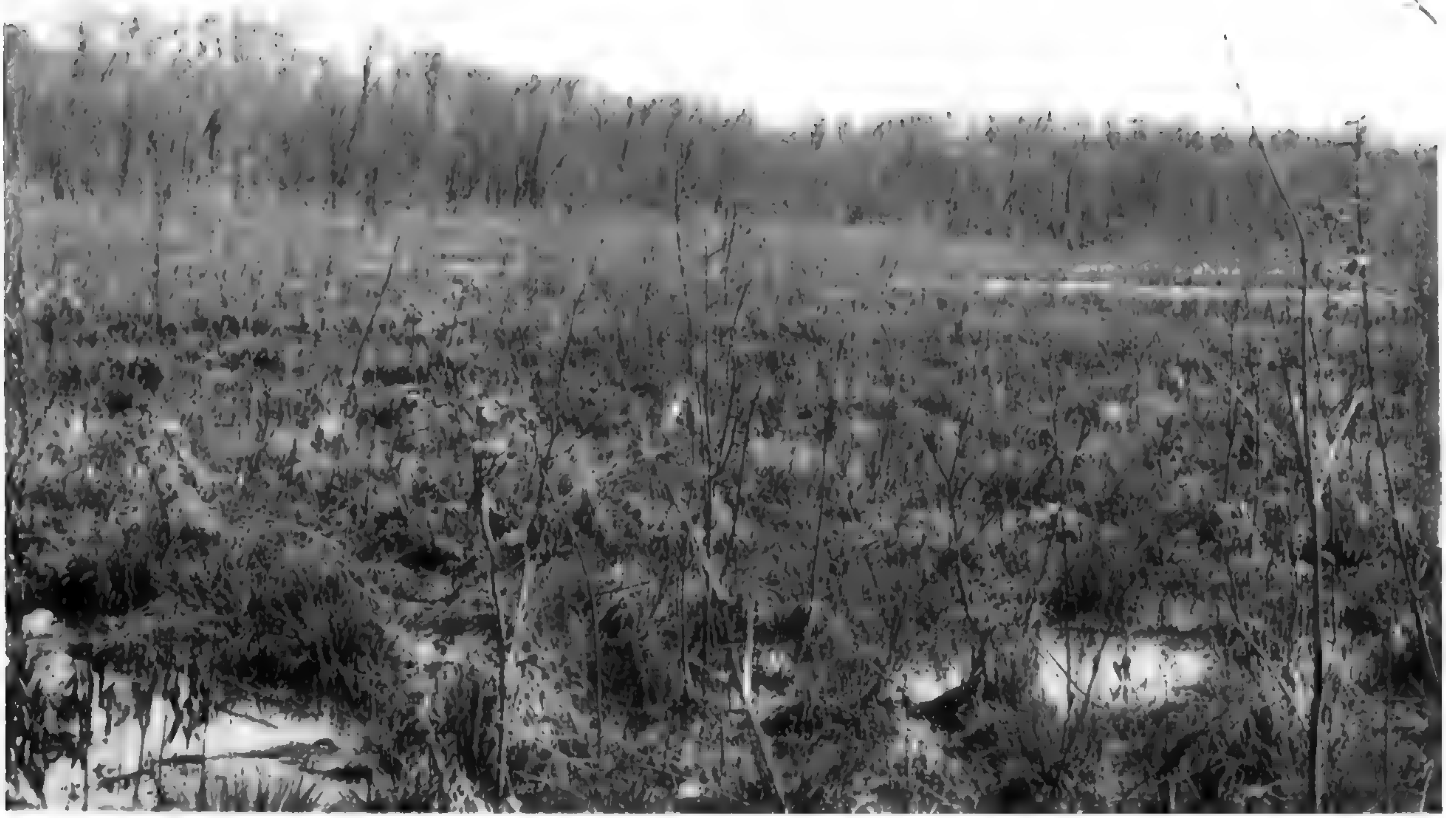


Figure 8.—Wetland wildlife habitat in an area near Clinton Lake.

Protecting the natural vegetation or establishing a permanent cover of vegetation along drainageways and streams, protecting the woodland from grazing by livestock, and applying good pasture management and the measures identified in the description of wildlife area 1 can improve the habitat for wildlife. Establishing food plots by flooding the adjacent farmland and establishing shallow water areas adjacent to Clinton Lake can help to attract waterfowl to this area.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey,

determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil (fig. 9). The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect

Figure 9.—A gently rolling area on the Shelbyville Moraine, which provides excellent sites for homes.

trafficability after vegetation is established.

Sanitary Facilities

Table 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if

the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable or improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The

thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable

material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(11)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments larger than 3 inches in diameter are

indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very

high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

The shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a

layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 18, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol.* An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquoll (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (9)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Birkbeck Series

The Birkbeck series consists of moderately well drained soils on till plains in the uplands. These soils formed in loess and in the underlying loam till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 1 to 8 percent.

Birkbeck soils are similar to Camden, Rozetta, Russell, and St. Charles soils and are commonly adjacent to Miami and Russell soils. Camden and St. Charles soils formed in loess and loamy outwash. Rozetta soils formed entirely in loess. The well drained Russell soils are on the steeper slopes below the Birkbeck soils. Their mantle of loess is thinner than that of the Birkbeck soils. The well drained Miami soils formed in glacial till on the steeper side slopes below the Birkbeck soils.

Typical pedon of Birkbeck silt loam, 1 to 4 percent slopes, 2,376 feet north and 1,250 feet east of the southwest corner of sec. 26, T. 20 N., R. 3 E.

Ap—0 to 3 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to weak fine subangular blocky; friable; slightly acid; clear smooth boundary.

E—3 to 7 inches; brown (10YR 4/3, 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate thin platy structure; friable; medium acid; abrupt smooth boundary.

Bt1—7 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium angular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—17 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/8) and common fine faint brown (10YR 5/3) mottles; moderate medium and coarse angular blocky structure; firm; few distinct light gray (10YR 7/2) silt coatings and common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide within peds; medium acid; clear smooth boundary.

Bt3—31 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; few distinct very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds and in root channels; common fine stains and concretions of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Bt4—40 to 52 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium and coarse prismatic structure; friable; few faint very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds and in root channels; common fine stains and concretions of iron and manganese oxide within peds; neutral; abrupt smooth boundary.

2BC—52 to 60 inches; yellowish brown (10YR 5/4 and 5/6) loam; few fine distinct gray (10YR 5/1) and common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few faint dark brown (10YR 3/3) clay films in root channels; common fine stains and concretions of iron and manganese oxide; common pebbles; mildly alkaline.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The content of clay in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2C horizon, if it occurs, has value of 4 to 6 and chroma of 2 to 4.

Broadwell Series

The Broadwell series consists of well drained soils on outwash plains in the uplands. These soils formed in loess and in the underlying sandy material. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slopes range from 2 to 5 percent.

Broadwell soils are similar to Catlin, Dana, Plano, Proctor, and Tama soils and commonly are adjacent to Lawndale, Sable, and Tama soils. Catlin and Dana soils formed in loess and glacial till. Plano and Proctor soils have a lower content of sand in the lower part than the Broadwell soils. Tama soils formed entirely in loess. They are in landscape positions similar to those of the Broadwell soils. The somewhat poorly drained Lawndale soils are in nearly level areas below the Broadwell soils. The poorly drained Sable soils are lower on the landscape than the Broadwell soils.

Typical pedon of Broadwell silt loam, 2 to 5 percent slopes, 396 feet south and 500 feet east of the northwest corner of sec. 19, T. 20 N., R. 1 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak

medium subangular blocky structure; friable; neutral; clear smooth boundary.

AB—10 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; medium acid; clear smooth boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—23 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 40 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt4—40 to 51 inches; dark yellowish brown (10YR 4/6) silt loam; weak medium subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; medium acid; abrupt smooth boundary.

2BC—51 to 60 inches; dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) loamy fine sand and fine sand; weak medium and coarse subangular blocky structure; loose; few faint dark brown (10YR 3/3) clay films in root channels; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon ranges from 10 to 16 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 to 6. The 2BC horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. It is loamy sand, loamy fine sand, fine sand, or sand. Some pedons have a 2C horizon within a depth of 60 inches. This horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is fine sand, sand, loamy fine sand, or loamy sand.

Camden Series

The Camden series consists of well drained soils on stream terraces. These soils formed in loess and in the underlying loamy outwash. Permeability is moderate in the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 5 to 10 percent.

Camden soils are similar to Birkbeck, Rozetta, Russell, and St. Charles soils and commonly are adjacent to St. Charles and Lawson soils. Birkbeck and Russell soils formed in loess and glacial till. Rozetta soils formed entirely in loess. St. Charles soils are higher on the stream terraces than the Camden soils. Also, they formed in a thicker mantle of loess. Lawson soils are on flood plains below the Camden soils.

Typical pedon of Camden silt loam, 5 to 10 percent slopes, eroded, 561 feet east and 264 feet south of the northwest corner of sec. 17, T. 19 N., R. 2 E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; mixed with streaks and pockets of yellowish brown (10YR 5/4) silty clay loam from the subsoil; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—4 to 15 inches; yellowish brown (10YR 5/6) silty clay loam; strong fine angular blocky structure; friable; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—15 to 25 inches; yellowish brown (10YR 5/6) silty clay loam; strong medium angular blocky structure; firm; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; strongly acid; clear smooth boundary.

Bt3—25 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains of manganese oxide within peds; strongly acid; abrupt smooth boundary.

2Bt4—30 to 45 inches; yellowish brown (10YR 5/6) loam and sandy loam; weak medium subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; few pebbles; slightly acid; clear smooth boundary.

2C—45 to 60 inches; yellowish brown (10YR 5/6), stratified sandy loam, loam, and loamy sand; massive; friable; few fine stains of iron and manganese oxide along vertical cracks; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess ranges from

24 to 40 inches. The content of clay ranges from 18 to 35 percent in the control section.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The Bt and 2BC horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The 2Bt horizon is dominantly sandy loam, loam, or silt loam but in some pedons has thin strata of loamy sand. The 2C horizon has value of 4 to 6 and chroma of 3 to 6. It is stratified sandy loam, loam, silt loam, or loamy sand.

Catlin Series

The Catlin series consists of moderately well drained, moderately permeable soils on till plains and moraines in the uplands. These soils formed in loess and in the underlying loamy glacial till. Slopes range from 2 to 10 percent.

Catlin soils are similar to Broadwell, Dana, Plano, Proctor, and Tama soils and commonly are adjacent to Ipava and Sable soils. Broadwell soils formed in loess and sandy material. Dana soils have a mantle of loess that is thinner than that of the Catlin soils. Plano and Proctor soils formed in loess and loamy outwash. Tama soils formed entirely in loess. The somewhat poorly drained Ipava and poorly drained Sable soils are in the less sloping areas below the Catlin soils.

Catlin silty clay loam, 2 to 5 percent slopes, eroded, has a thinner dark surface layer than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Typical pedon of Catlin silty clay loam, 2 to 5 percent slopes, eroded, 627 feet west and 462 feet south of the northeast corner of sec. 6, T. 20 N., R. 3 E.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; mixed with streaks and pockets of brown (10YR 4/3) silty clay loam from the subsoil; weak fine granular structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 14 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—14 to 21 inches; dark yellowish brown (10YR 3/4) silty clay loam; moderate medium subangular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—21 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; many distinct very dark brown (10YR 2/2) and brown (10YR 4/3) clay films on faces of peds; few fine stains of manganese oxide within peds; slightly acid; clear smooth boundary.

Bt4—27 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; common faint brown (10YR 4/3) clay films on faces of peds and few distinct very dark brown (10YR 2/2) clay films in root channels; common medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

2BC—41 to 46 inches; yellowish brown (10YR 5/4) loam; common medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; firm; few faint brown (10YR 4/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; gradual smooth boundary.

2C—46 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) loam; massive; firm; few fine concretions of iron and manganese oxide along vertical cracks; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The content of clay ranges from 27 to 35 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The 2BC and 2C horizons are silt loam, loam, or clay loam.

Dana Series

The Dana series consists of moderately well drained soils on till plains and moraines in the uplands. These soils formed in loess and in the underlying calcareous, loamy glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 2 to 6 percent.

The Dana soils in this county have a thinner dark surface soil than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Dana soils are similar to Broadwell, Catlin, Parr, Plano, Proctor, and Tama soils and commonly are adjacent to Catlin and Ipava soils. Broadwell soils formed in loess and sandy material. Catlin soils have a mantle of loess that is thicker than that of the Dana

soils. They are in landscape positions similar to those of the Dana soils. Parr soils formed almost entirely in loamy till. Plano and Proctor soils formed in loess and in the underlying loamy outwash. Tama soils and the somewhat poorly drained Ipava soils formed entirely in loess. Ipava soils are in the less sloping areas below the Dana soils.

Typical pedon of Dana silt loam, 2 to 6 percent slopes, eroded, 330 feet west and 2,112 feet north of the southeast corner of sec. 7, T. 20 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with streaks and pockets of yellowish brown (10YR 5/4) silty clay loam from the subsoil; weak fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; yellowish brown (5/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—12 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) and common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; medium acid; gradual smooth boundary.

Bt3—22 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; medium acid; abrupt smooth boundary.

2Bt4—30 to 43 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct grayish brown (10YR 5/2) mottles in the lower 6 inches; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; few pebbles; neutral; clear smooth boundary.

2BC—43 to 47 inches; brown (10YR 4/3) and yellowish brown (10YR 5/4) loam; few fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine stains of iron and manganese oxide within peds; few pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

2C—47 to 60 inches; brown (10YR 4/3) loam; few fine and medium distinct grayish brown (10YR 5/2) mottles; massive; firm; few fine and medium stains and concretions of iron and manganese oxide along vertical cracks; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 50 inches. The thickness of the loess ranges from 20 to 40 inches. The content of clay ranges from 27 to 35 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The 2C horizon is loam or clay loam.

Denny Series

The Denny series consists of poorly drained, slowly permeable soils in depressions on till plains and outwash plains in the uplands. These soils formed in loess. Slopes are 0 to 1 percent.

Denny soils commonly are adjacent to Ipava and Sable soils. The somewhat poorly drained Ipava soils are on low ridges above the Denny soils. The poorly drained Sable soils are on broad flats on the slightly higher parts of the landscape.

Typical pedon of Denny silt loam, 825 feet east and 75 feet north of the southwest corner of sec. 5, T. 19 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some grayish brown (10YR 5/2) silt loam; gray (10YR 5/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; neutral; abrupt smooth boundary.

Eg1—9 to 14 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Eg2—14 to 20 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Btg1—20 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine angular blocky structure; firm; few faint very dark gray (10YR 3/1) and dark gray (N 4/0) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—25 to 30 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to

moderate fine angular blocky; firm; few distinct very dark gray (10YR 3/1) and dark gray (N 4/0) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; neutral; gradual wavy boundary.

Btg3—30 to 55 inches; light olive gray (5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure parting to weak medium angular blocky; friable; few distinct very dark gray (10YR 3/1) clay films in root channels and on faces of peds and few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; neutral; gradual wavy boundary.

Cg—55 to 60 inches; light olive gray (5Y 6/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium concretions and stains of iron and manganese oxide within peds; neutral.

The thickness of the solum ranges from 40 to 60 inches. The content of clay ranges from 35 to 45 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Cg horizon hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

Elburn Series

The Elburn series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Permeability is moderate in the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 0 to 2 percent.

Elburn soils are similar to Ipava and Lawndale soils and commonly are adjacent to Plano and Sable soils. Ipava soils formed entirely in loess and have a higher content of clay in the control section than the Elburn soils. Lawndale soils formed in loess and sandy material. Plano soils are well drained and are in the slightly higher or more sloping areas. Sable soils are poorly drained and are in low areas below the Elburn soils.

Typical pedon of Elburn silt loam, 2,640 feet west and 330 feet south of the northeast corner of sec. 18, T. 19 N., R. 2 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure; friable; medium acid; clear smooth boundary.

A—10 to 14 inches; silt loam, very dark grayish brown (10YR 3/2) crushed, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

BA—14 to 18 inches; brown (10YR 4/3) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—18 to 24 inches; silty clay loam, brown (10YR 4/3) crushed; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 32 inches; brown (10YR 4/3) silty clay loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium angular and subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; medium acid; gradual wavy boundary.

Bt3—32 to 44 inches; brown (10YR 4/3) silt loam; few fine distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure; friable; few distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

2BC—44 to 56 inches; brown (10YR 4/3), stratified silt loam, loam, and sandy loam; common distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films in root channels; few pebbles; slightly acid; gradual wavy boundary.

2C—56 to 60 inches; brown (10YR 4/3), stratified sandy loam and silt loam; common fine distinct dark gray (10YR 4/1) mottles; massive; friable; few pebbles; slightly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from

40 to 60 inches. The thickness of the mollic epipedon ranges from 11 to 18 inches. The content of clay ranges from 25 to 35 percent in the control section.

The Ap and A horizons have value of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The 2BC and 2C horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 8. They are stratified silt loam, sandy loam, loam, or clay loam.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on outwash plains and till plains. These soils formed in calcareous, silty material. Slopes range from 0 to 2 percent.

Harpster soils are similar to Hartsburg and Sable soils and are commonly adjacent to Catlin, Hartsburg, and Ipava soils. Hartsburg and Sable soils do not have carbonates within a depth of 20 inches. They are in landscape positions similar to those of the Harpster soils. The somewhat poorly drained Ipava soils are slightly higher on the landscape than the Harpster soils. The moderately well drained Catlin soils are in the higher and more sloping areas. They formed in loess and in the underlying loamy glacial till.

Typical pedon of Harpster silty clay loam, 2,310 feet north and 396 feet east of the southwest corner of sec. T. 20 N., R. 2 E.

Akp—0 to 9 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; weak fine subangular blocky structure; friable; few snail shells; strong effervescence; moderately alkaline; clear smooth boundary.

Ak—9 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; few fine and medium stains and concretions of calcium carbonate occurring as filaments within peds; few snail shells; strong effervescence; moderately alkaline; abrupt smooth boundary.

Bg1—15 to 20 inches; olive gray (5Y 4/2) silty clay loam; few fine prominent olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; firm; few faint black (10YR 2/1) clay films on faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

Bg2—20 to 28 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/4) mottles; strong medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark gray (N 4/0) clay films on faces of peds; few fine stains and concretions of iron oxide and calcium carbonate within peds; few snail shells; slight effervescence; moderately alkaline; clear smooth boundary.

Bg3—28 to 40 inches; dark gray (5Y 4/1) silty clay loam; many fine and medium prominent light olive brown (2.5Y 5/6) mottles; strong medium prismatic structure parting to moderate medium angular blocky; firm; few distinct dark gray (N 4/0) clay films on faces of peds; few fine and medium stains and concretions of iron oxide and calcium carbonate within peds; few snail shells; few black (10YR 2/1) krotovinas; strong effervescence; moderately alkaline; gradual wavy boundary.

BC—40 to 45 inches; olive gray (5Y 5/2) silty clay loam; many fine and medium prominent light olive brown (2.5Y 5/6) and yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; few faint dark gray (N 4/0) clay films on faces of peds; few fine and medium stains and concretions of iron oxide and calcium carbonate within peds; common snail shells; few black (10YR 2/1) krotovinas; strong effervescence; moderately alkaline; gradual wavy boundary.

Cg—45 to 60 inches; mottled olive gray (5Y 5/2) and light olive brown (2.5Y 5/6) silt loam; massive; friable; common medium stains and concretions of iron oxide and calcium carbonate along vertical cracks; common snail shells; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 46 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches. The content of clay in the 10- to 40-inch control section ranges from 27 to 35 percent.

The Akp and Ak horizons have hue of 10YR or 5Y or are neutral in hue. They have value of 2 or 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 6. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 8.

Hartsburg Series

The Hartsburg series consists of poorly drained, moderately permeable soils on outwash plains and till plains. These soils formed in loess. Slopes range from 0 to 2 percent.

Hartsburg soils are similar to Harpster and Sable soils and commonly are adjacent to Catlin, Ipava, and Sable soils. The moderately well drained Catlin soils

formed in loess and in the underlying glacial till. They are in the higher or more sloping areas. Harpster soils have a calcic horizon. The somewhat poorly drained Ipava soils are slightly higher on the landscape than the Hartsburg soils. Also, they contain more clay in the control section. Sable soils do not have carbonates within a depth of 40 inches. They are in landscape positions similar to those of the Hartsburg soils.

Typical pedon of Hartsburg silty clay loam, 1,220 feet west and 1,350 feet south of the northeast corner of sec. 9, T. 20 N., R. 2 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (N 4/0) dry; moderate fine and medium subangular blocky structure parting to weak fine granular; friable; mildly alkaline; clear smooth boundary.

A—9 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (N 4/0) dry; weak fine and medium subangular blocky structure; friable; mildly alkaline; abrupt smooth boundary.

Bg1—14 to 20 inches; dark gray (5Y 4/1) silty clay loam; moderate fine and medium subangular blocky structure; friable; few faint black (10YR 2/1) clay films on faces of peds; mildly alkaline; abrupt smooth boundary.

Bg2—20 to 24 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to weak fine subangular blocky; friable; few faint gray (5Y 5/1) clay films on faces of peds; slight effervescence; mildly alkaline; abrupt smooth boundary.

Bg3—24 to 27 inches; olive gray (5Y 5/2) and gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to weak medium subangular blocky; friable; few fine stains and concretions of calcium carbonate within peds; few black (10YR 2/1) krotovinas; strong effervescence; mildly alkaline; clear wavy boundary.

BCg—27 to 39 inches; olive gray (5Y 5/2) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few faint gray (5Y 5/1) clay films on faces of peds; few fine and medium stains and concretions of iron oxide and calcium carbonate within peds; black (10YR 2/1) krotovinas; violent effervescence; moderately alkaline; clear wavy boundary.

Cg—39 to 60 inches; olive gray (5Y 5/2) silt loam; few fine prominent dark yellowish brown (10YR 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium stains and concretions of iron oxide and calcium carbonate along vertical cracks; few black (10YR 2/1) krotovinas; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 48 inches. The depth to free carbonates ranges from 20 to 35 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches. The content of clay in the 10- to 40-inch control section ranges from 25 to 35 percent.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or they are neutral in hue and have value of 2 or 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y and value of 3 to 5. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils in the uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Ipava soils are similar to Elburn and Lawndale soils and commonly are adjacent to Sable and Tama soils. Elburn soils formed in loess and loamy outwash. Lawndale soils formed in loess and sandy material. The poorly drained Sable soils are in areas below the Ipava soils and are subject to ponding. They have less clay in the control section than the Ipava soils. The moderately well drained Tama soils are in the more sloping areas above the Ipava soils. They have less clay in the control section than the Ipava soils.

Typical pedon of Ipava silt loam, 86 feet east and 3,600 feet south of the northwest corner of sec. 10, T. 20 N., R. 3 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

A1—7 to 13 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium angular blocky structure; friable; neutral; abrupt smooth boundary.

A2—13 to 18 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine angular blocky structure; friable; neutral; clear smooth boundary.

Bt—18 to 32 inches; brown (10YR 4/3) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine

distinct yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium stains of iron and manganese oxide within peds; slightly acid; gradual smooth boundary.

Btg1—32 to 44 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent gray (10YR 5/1) and grayish brown (10YR 5/2) and common fine and medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium stains of iron and manganese oxide within peds; slightly acid; gradual smooth boundary.

Btg2—44 to 55 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) and common fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; very few faint dark gray (10YR 4/1) clay films on faces of peds; few medium stains of iron and manganese oxide within peds; neutral; clear smooth boundary.

Cg—55 to 60 inches; grayish brown (2.5Y 5/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; common fine concretions and few fine stains of iron and manganese oxide along vertical cracks; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the mollic epipedon ranges from 14 to 20 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt and Btg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 2 to 4. They are silty clay loam or silty clay. The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4.

Keomah Series

The Keomah series consists of somewhat poorly drained, slowly permeable and moderately slowly permeable soils in the uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Keomah soils commonly are adjacent to Birkbeck and Rozetta soils. The adjacent soils are moderately well drained and are on the steeper slopes and higher knolls. They have less clay in the control section than the Keomah soils.

Typical pedon of Keomah silt loam, 2,310 feet west and 165 feet north of the southeast corner of sec. 28, T. 20 N., R. 3 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

E—5 to 12 inches; grayish brown (10YR 5/2) silt loam; moderate medium platy structure; friable; few fine stains of iron and manganese oxide within peds; very strongly acid; abrupt smooth boundary.

Bt—12 to 17 inches; brown (10YR 4/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; strong fine angular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films and few faint light gray (10YR 6/1) silt coatings on faces of peds; few fine stains of iron oxide within peds; very strongly acid; clear smooth boundary.

Btg1—17 to 29 inches; dark grayish brown (10YR 4/2) silty clay; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to strong fine angular blocky; firm; common distinct brown (10YR 4/3) clay films in root channels and many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine stains of iron oxide within peds; strongly acid; clear smooth boundary.

Btg2—29 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine and medium prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; common distinct olive gray (5Y 4/2) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; strongly acid; clear smooth boundary.

BCg—43 to 50 inches; olive gray (5Y 5/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/8) mottles; very weak coarse prismatic structure; friable; few faint dark gray (5Y 4/1) clay films occurring as linings in root channels; many fine concretions of iron and manganese oxide; medium acid; gradual smooth boundary.

Cg—50 to 60 inches; mottled olive gray (5Y 4/2) and yellowish brown (10YR 5/8) silt loam; massive; friable; few fine stains of iron and manganese oxide along vertical cracks; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 2 or 3. The Bt and Btg horizons have value of 4 or 5 and

chroma of 1 to 4. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam.

Lawndale Series

The Lawndale series consists of somewhat poorly drained soils on outwash plains in the uplands. These soils formed in loess and in the underlying sandy material. Permeability is moderate in the upper part of the profile and moderately rapid or rapid in the lower part. Slopes range from 0 to 2 percent.

Lawndale soils are similar to Elburn and Ipava soils and commonly are adjacent to Broadwell, Plano, and Sable soils. Elburn and Plano soils formed in loess and loamy outwash. Ipava soils formed entirely in loess and have more clay in the subsoil than the Lawndale soils. Broadwell and Plano soils are well drained and are in the slightly higher or more sloping areas. Sable soils are poorly drained and are on flats below the Lawndale soils.

Typical pedon of Lawndale silt loam, 2,574 feet north and 2,600 feet east of the southwest corner of sec. 30, T. 20 N., R. 1 E.

Ap—0 to 14 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure parting to weak fine subangular blocky; friable; neutral; abrupt smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—19 to 27 inches; brown (10YR 4/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—27 to 39 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and common fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BC1—39 to 50 inches; olive brown (2.5Y 4/4) silt loam; common fine and medium distinct gray (10YR 5/1) and many fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; common fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

2BC2—50 to 60 inches; dark yellowish brown (10YR 3/4) loamy fine sand; few medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; very friable; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon ranges from 12 to 18 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 to 6. The 2BC horizon is loamy sand, loamy fine sand, fine sand, or sand.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Lawson soils are similar to Sawmill soils and commonly are adjacent to Ross and Sawmill soils. The well drained Ross soils are slightly higher on the flood plains than the Lawson soils and are nearer to streams. The poorly drained Sawmill soils are lower on the landscape than the Lawson soils.

Typical pedon of Lawson silt loam, 495 feet west and 1,254 feet north of the southeast corner of sec. 12, T. 19 N., R. 2 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A1—8 to 25 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

A2—25 to 30 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine prismatic structure; friable; mildly alkaline; clear smooth boundary.

A3—30 to 35 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine faint dark grayish brown (10YR 4/2) and brown (10YR 4/3) mottles; weak fine subangular blocky structure; friable; few fine stains of iron oxide within peds; mildly alkaline; gradual smooth boundary.

Cg—35 to 60 inches; dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silty clay loam; few fine prominent olive brown (2.5Y 4/4) mottles; massive; friable; few fine stains and concretions of iron oxide along vertical cracks; mildly alkaline.

The mollic epipedon ranges from 24 to 36 inches in thickness. The content of clay in the control section ranges from 18 to 30 percent.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Cg horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3. It is silty clay loam or silt loam.

Miami Series

The Miami series consists of well drained soils on side slopes in the uplands. These soils formed in loamy glacial till that in some areas is mantled with loess. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 10 to 50 percent.

Miami soils are similar to Russell soils and commonly are adjacent to Birkbeck and Russell soils. Birkbeck and Russell soils formed in loess and glacial till. They are in the less sloping areas above the Miami soils.

Typical pedon of Miami silt loam, 30 to 50 percent slopes, 1,056 feet east and 1,782 feet north of the southwest corner of sec. 26, T. 20 N., R. 3 E.

A—0 to 5 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; about 43 percent sand; few pebbles; slightly acid; abrupt smooth boundary.

E—5 to 7 inches; brown (10YR 5/3) silt loam; weak medium platy structure; friable; about 27 percent sand; few pebbles; medium acid; clear smooth boundary.

Bt1—7 to 11 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; about 30 percent sand; few pebbles; medium acid; clear smooth boundary.

Bt2—11 to 21 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; friable; many faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 29 percent sand; few pebbles; strongly acid; clear smooth boundary.

Bt3—21 to 30 inches; brown (10YR 4/3) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; common faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 32 percent sand; few pebbles; strongly acid; clear smooth boundary.

Bt4—30 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 30 percent sand; common pebbles; neutral; clear smooth boundary.

BC—38 to 49 inches; dark yellowish brown (10YR 4/4) loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few fine stains of iron oxide within peds; about 31 percent sand; few pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

C—49 to 60 inches; brown (10YR 5/3) loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; about 32 percent sand; common pebbles; strong effervescence; mildly alkaline.

The mantle of loess, if it occurs, is as much as 18 inches thick. The A or Ap horizon has value of 3 to 5 and chroma of 1 to 3. It is loam or silt loam. The E horizon has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is silt loam, clay loam, or silty clay loam. The C horizon has value of 5 or 6 and chroma of 3 or 4. It is clay loam or loam.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium overlying a buried soil. Slopes range from 0 to 2 percent.

The Orion soils in this county have slightly more clay in the control section than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Orion soils are commonly adjacent to Lawson, Miami, and Sawmill soils. Lawson soils have a mollic epipedon. They are in landscape positions similar to those of the Orion soils. Miami soils are well drained and are on the steeper upland slopes bordering the flood plains. Sawmill soils are poorly drained and are in swales below the Orion soils. They have a mollic epipedon.

Typical pedon of Orion silt loam, 528 feet west and 1,716 feet north of the southeast corner of sec. 31, T. 20 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

C—8 to 38 inches; brown (10YR 4/3, 5/3) silt loam; few thin light brownish gray (10YR 6/2) and pale brown (10YR 6/3) strata; few fine faint grayish brown (10YR 5/2) and very few fine prominent yellowish brown (10YR 5/8) mottles; weak thick platy structure parting to weak fine subangular blocky; friable; few faint very dark gray (10YR 3/1) organic coatings in root channels; mildly alkaline; clear smooth boundary.

Ab1—38 to 47 inches; very dark gray (10YR 3/1) silt loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine stains and concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

Ab2—47 to 52 inches; black (10YR 2/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine stains of manganese oxide within peds; mildly alkaline; clear smooth boundary.

C′—52 to 60 inches; dark grayish brown (10YR 4/2), stratified silt loam and loam; few fine prominent yellowish brown (10YR 5/4, 5/8) mottles; weak thick platy structure parting to very weak fine subangular blocky; friable; few fine stains of iron oxide along vertical cracks; mildly alkaline.

Depth to the buried soil ranges from 20 to 40 inches. The Ap and C horizons have value of 4 or 5 and chroma of 2 or 3. The Ab horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is silt loam or silty clay loam. The C′ horizon has value of 4 to 6 and chroma of 1 or 2.

Parr Series

The Parr series consists of well drained soils on till plains and moraines in the uplands. These soils formed in a thin mantle of loess and in the underlying loamy glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 5 to 10 percent.

The Parr soils in this county have a dark surface layer that is thinner than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Parr soils are similar to Dana soils and commonly are adjacent to Catlin and Dana soils. Catlin and Dana soils have a mantle of loess that is thicker than that of the Parr soils. They are in landscape positions similar to those of the Parr soils. Dana soils are moderately well drained.

Typical pedon of Parr silt loam, 5 to 10 percent slopes, eroded, 400 feet east and 957 feet north of the southwest corner of sec. 32, T. 19 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with some streaks and pockets of dark yellowish brown (10YR 4/4) silty clay loam from the subsoil; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—13 to 21 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; few fine pebbles; slightly acid; clear smooth boundary.

2Bt3—21 to 29 inches; dark yellowish brown (10YR 4/4, 4/6) clay loam; weak medium prismatic structure parting to moderate medium angular blocky; friable; common distinct dark yellowish brown (10YR 3/4) clay films on faces of peds and in root channels; few fine and medium stains and concretions of iron and manganese oxide; few pebbles; slightly acid; clear smooth boundary.

2Bt4—29 to 35 inches; yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure; friable; few distinct dark yellowish brown (10YR 3/4) clay films on faces of peds; few fine and medium stains and concretions of iron and manganese oxide; few pebbles; neutral; clear smooth boundary.

2BC—35 to 39 inches; yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure; friable; few fine and medium stains and concretions of iron and manganese oxide; few pebbles; neutral; clear smooth boundary.

2C—39 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; common pebbles; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 40 inches. The loess is less than 18 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. The 2C horizon has value of 5 or 6 and chroma of 3 or 4.

Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils in depressions on till plains. These soils formed in colluvial sediments. Slopes are 0 to 1 percent.

Peotone soils are similar to Sawmill and Shiloh soils and commonly are adjacent to Ipava and Sable soils. Sawmill soils have a lower content of clay than the Peotone soils. They are on flood plains. Shiloh soils have slightly less sand in the control section than the Peotone soils. Ipava and Sable soils are better drained than the Peotone soils and are slightly higher on the landscape. They have a mollic epipedon that is less than 24 inches thick.

Typical pedon of Peotone silty clay loam, 1,122 feet east and 2,343 feet north of the southwest corner of sec. 19, T. 19 N., R. 2 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; medium acid; clear smooth boundary.

A1—7 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

A2—12 to 22 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate medium subangular blocky structure; friable; neutral; clear smooth boundary.

Bg1—22 to 28 inches; very dark gray (N 3/0) silty clay loam, gray (N 5/0) dry; moderate medium prismatic structure parting to moderate fine and medium angular blocky; friable; neutral; clear smooth boundary.

Bg2—28 to 33 inches; dark gray (5Y 4/1) silty clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few faint dark gray (N 4/0) clay films on faces of peds; few faint black (10YR 2/1) krotovinas; few fine stains and concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bg3—33 to 47 inches; gray (5Y 5/1) silty clay loam; few fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate fine angular blocky; friable; few faint dark gray (5Y 4/1) clay films on faces of peds; few faint black (10YR 2/1) krotovinas; common fine stains and concretions of iron and manganese oxide; mildly alkaline; gradual smooth boundary.

BCg—47 to 60 inches; light gray (5Y 6/1) silt loam; few fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; few faint black (10YR 2/1) krotovinas; few fine and medium stains and concretions of iron and manganese oxide; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches. The content of clay in the 10- to 40-inch control section ranges from 35 to 45 percent.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 or 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 2. Some pedons have a Cg horizon within a depth of 60 inches. This horizon is silt loam or silty clay loam.

Plano Series

The Plano series consists of well drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Slopes range from 0 to 5 percent.

Plano soils are similar to Broadwell, Catlin, Dana, Proctor, and Tama soils and commonly are adjacent to Broadwell, Catlin, Dana, Elburn, and Ipava soils. Broadwell soils formed in loess and sandy material. They are in landscape positions similar to those of the Plano soils. The moderately well drained Catlin and Dana soils formed in loess and loamy glacial till. They are in landscape positions similar to those of the Plano soils. Proctor soils have a mantle of loess that is thinner than that of the Plano soils. Ipava and Tama soils formed entirely in loess. Elburn and Ipava soils are somewhat poorly drained and are on the flatter parts of the landscape below the Plano soils.

Typical pedon of Plano silt loam, 0 to 2 percent slopes, 1,881 feet east and 1,419 feet north of the southwest corner of sec. 15, T. 19 N., R. 1 E.

Ap—0 to 13 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak

medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

BA—13 to 17 inches; dark brown (10YR 3/3) silty clay loam; moderate fine subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—17 to 23 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Bt2—23 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and coarse subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds and very dark grayish brown (10YR 3/2) clay films in root channels; few fine stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Bt3—36 to 44 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium and coarse subangular blocky structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds and very dark grayish brown (10YR 3/2) clay films in root channels; few fine stains of iron and manganese oxide within peds; slightly acid; abrupt smooth boundary.

2BC—44 to 60 inches; brown (10YR 4/3) and dark yellowish brown (10YR 3/4), stratified sandy loam, loam, and silt loam; few fine distinct grayish brown (10YR 5/2) mottles in the lower part; weak medium and coarse subangular blocky structure; very friable; few faint very dark grayish brown (10YR 3/2) clay films in root channels; few fine stains of iron and manganese oxide within peds; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The content of clay ranges from 25 to 35 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5.

Plano silt loam, 2 to 5 percent slopes, eroded, has a thinner dark surface layer than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Proctor Series

The Proctor series consists of well drained soils on stream terraces and outwash plains. These soils formed in loess and in the underlying loamy outwash. Permeability is moderate in the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 2 to 6 percent.

The Proctor soils in this county have a thinner dark surface layer than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Proctor soils are similar to Broadwell, Catlin, Dana, Plano, and Tama soils and commonly are adjacent to Ipava, Lawson, and Plano soils. Broadwell soils formed in loess and sandy material. Catlin and Dana soils formed in loess and glacial till. Plano soils have a mantle of loess that is thicker than that of the Proctor soils. They are in positions on the landscape similar to those of the Proctor soils. Ipava and Tama soils formed entirely in loess. Ipava and Lawson soils are somewhat poorly drained. Ipava soils are in the less sloping areas. Lawson soils are on flood plains below the Proctor soils.

Typical pedon of Proctor silt loam, 2 to 6 percent slopes, eroded, 1,320 feet north and 660 feet west of the southeast corner of sec. 16, T. 21 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with streaks of brown (10YR 4/3) silty clay loam from the subsoil; weak fine subangular blocky structure parting to moderate fine granular; friable; strongly acid; abrupt smooth boundary.

Bt1—9 to 13 inches; brown (10YR 4/3) silty clay loam; moderate medium granular structure; friable; few faint very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; abrupt smooth boundary.

Bt2—13 to 22 inches; brown (10YR 4/3) silty clay loam; strong medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear wavy boundary.

2Bt3—22 to 28 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common medium stains and concretions of iron and manganese oxide; few pebbles; neutral; gradual smooth boundary.

2BC—28 to 42 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films on faces of peds and in

root channels; few fine stains and concretions of iron and manganese oxide; few pebbles; neutral; gradual smooth boundary.

2C—42 to 60 inches; dark yellowish brown (10YR 4/4), stratified sandy loam and loam; massive; friable; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 3 to 6. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is loam, clay loam, or silt loam. The 2C horizon is stratified loamy sand, sandy loam, loam, or silt loam.

Ross Series

The Ross series consists of well drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Ross soils are commonly adjacent to the somewhat poorly drained Lawson and poorly drained Sawmill soils. The adjacent soils are lower on the flood plains than the Ross soils.

Typical pedon of Ross loam, 2,310 feet east and 1,683 feet north of the southwest corner of sec. 7, T. 19 N., R. 3 E.

Ap—0 to 8 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; neutral; clear smooth boundary.

A—8 to 14 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak medium prismatic structure parting to weak fine and medium subangular blocky; friable; neutral; clear smooth boundary.

Bw1—14 to 32 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; few faint black (10YR 2/1) clay films on faces of peds; neutral; clear smooth boundary.

Bw2—32 to 37 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

C—37 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; friable; few thin very dark grayish brown (10YR 3/2) clay films in root channels; neutral.

The solum ranges from 30 to 60 inches in thickness. The thickness of the mollic epipedon ranges from 24 to 40 inches.

The Ap and A horizons have chroma of 1 to 3. The Bw horizon has value of 2 to 5 and chroma of 1 to 4. The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is dominantly sandy loam, loam, or silt loam. In some pedons, however, the lower part has thin strata of loamy sand.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands and high stream terraces. These soils formed in loess. Slopes range from 1 to 5 percent.

Rozetta soils are similar to Birkbeck, Camden, Russell, and St. Charles soils and commonly are adjacent to Keomah and Russell soils. Birkbeck and Russell soils formed in loess and in the underlying glacial till. The well drained Russell soils are on the steeper slopes below the Rozetta soils. Camden and St. Charles soils formed in loess and loamy outwash. The somewhat poorly drained Keomah soils are on the flatter parts of the landscape below the Rozetta soils.

Typical pedon of Rozetta silt loam, 1 to 5 percent slopes, 990 feet east and 2,475 feet south of the northwest corner of sec. 22, T. 20 N., R. 3 E.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

E—5 to 10 inches; brown (10YR 4/3) silt loam; weak medium platy structure; friable; neutral; abrupt smooth boundary.

Bt1—10 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many distinct brown (10YR 4/3) clay films on faces of peds; few fine concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt2—20 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure; friable; many distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—31 to 42 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic

structure; friable; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct light gray (10YR 7/1) silt coatings on faces of peds; few medium stains and concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

BC—42 to 53 inches; brown (10YR 5/3) silt loam; common fine distinct dark yellowish brown (10YR 4/4) and common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure; friable; few distinct light gray (10YR 7/1) silt coatings and few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium concretions of iron and manganese oxide; medium acid; gradual smooth boundary.

C—53 to 60 inches; brown (10YR 5/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) mottles; massive; friable; very few faint dark yellowish brown (10YR 4/4) clay films along vertical cracks; medium acid.

The thickness of the solum ranges from 42 to more than 60 inches. The content of clay in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. The E horizon has value of 4 to 6 and chroma of 2 or 3. Some pedons do not have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The C horizon has value of 4 to 6 and chroma of 2 to 6.

Russell Series

The Russell series consists of well drained soils on side slopes in the uplands. These soils formed in loess and in the underlying loamy glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 5 to 15 percent.

Russell soils are similar to Birkbeck, Camden, Miami, Rozetta, and St. Charles soils and commonly are adjacent to Birkbeck and Miami soils. The moderately well drained Birkbeck and Rozetta soils generally are higher on the landscape than the Russell soils. Also, they formed in a thicker mantle of loess. Camden and St. Charles soils formed in loess and loamy outwash. Miami soils formed in loamy glacial till on side slopes below the Russell soils.

Typical pedon of Russell silt loam, 5 to 10 percent slopes, eroded, 2,900 feet north and 1,100 feet west of the southeast corner of sec. 32, T. 20 N., R. 3 E.

Ap—0 to 6 inches; mixed dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

Bt1—6 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine angular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 25 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint grayish brown (10YR 5/2) and brown (10YR 5/3) mottles in the lower 3 inches; moderate fine and medium angular blocky structure; firm; many distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains of manganese oxide within peds; strongly acid; clear smooth boundary.

2Bt3—25 to 36 inches; dark yellowish brown (10YR 4/4) loam; moderate medium prismatic structure; firm; few distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of manganese oxide within peds; few pebbles; medium acid; gradual smooth boundary.

2BC—36 to 44 inches; brown (10YR 4/4) loam; weak medium prismatic structure; firm; very few faint brown (10YR 4/3) clay films in root channels; few fine stains of manganese oxide within peds; common pebbles; medium acid; clear smooth boundary.

2C—44 to 60 inches; brown (10YR 4/4) clay loam; few fine prominent yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles in several pockets within the matrix; massive; firm; few fine stains of iron and manganese oxide along vertical cracks; common pebbles; neutral.

The thickness of the solum ranges from 40 to 55 inches. The thickness of the loess ranges from 22 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. It is silt loam or silty clay loam. The 2Bt and 2C horizons are clay loam or loam. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6.

Sable Series

The Sable series consists of poorly drained, moderately permeable soils in swales and on flats in the uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Sable soils are similar to Harpster and Hartsburg

soils and commonly are adjacent to Ipava and Tama soils. Harpster soils have a calcic horizon. Hartsburg soils have free carbonates within a depth of 40 inches. The somewhat poorly drained Ipava and moderately well drained Tama soils are higher on the landscape than the Sable soils. Also, Ipava soils have more clay in the control section.

Typical pedon of Sable silty clay loam, 1,452 feet west and 66 feet south of the northeast corner of sec. 17, T. 20 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—8 to 17 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; friable; few fine stains of iron oxide within peds; neutral; clear smooth boundary.

Btg1—17 to 22 inches; dark gray (5Y 4/1) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common faint black (10YR 2/1) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; neutral; clear smooth boundary.

Btg2—22 to 36 inches; olive gray (5Y 4/2) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure; firm; common faint dark gray (5Y 4/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg3—36 to 50 inches; dark gray (5Y 4/1) and gray (5Y 5/1) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; weak medium and coarse prismatic structure; friable; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine and medium stains and concretions of iron and manganese oxide; few black (10YR 2/1) krotovinas; neutral; clear smooth boundary.

Cg—50 to 60 inches; olive gray (5Y 5/2) silt loam; many prominent fine and medium yellowish brown (10YR 5/8) mottles; massive; friable; few fine and medium stains and concretions of iron and manganese oxide along vertical cracks; few black (10YR 2/1) krotovinas; neutral.

The solum ranges from 45 to 60 inches in thickness. The mollic epipedon ranges from 12 to 24 inches in thickness. The content of clay in the control section ranges from 24 to 35 percent.

The Ap and A horizons have hue of 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 or 1. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes are 0 to 1 percent.

Sawmill soils are similar to Lawson, Peotone, and Shiloh soils and commonly are adjacent to Lawson and Ross soils. Peotone and Shiloh soils contain more clay in the subsoil than the Sawmill soils. They are not flooded. Lawson and Ross soils are slightly higher on the landscape than the Sawmill soils. Lawson soils are somewhat poorly drained. Ross soils are well drained.

Typical pedon of Sawmill silty clay loam, 2,541 feet west and 1,155 feet north of the southeast corner of sec. 32, T. 21 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (N 4/1) dry; weak fine and medium angular blocky structure; friable; neutral; clear smooth boundary.

A1—9 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (N 4/1) dry; moderate medium angular blocky structure; friable; neutral; clear smooth boundary.

A2—13 to 26 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium and coarse prismatic structure; friable; few faint black (10YR 2/1) organic coatings on faces of peds; few fine stains and concretions of iron and manganese oxide; few pebbles; about 5 percent sand; neutral; clear smooth boundary.

Bg1—26 to 33 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium and coarse prismatic structure parting to moderate fine angular blocky; friable; few faint black (10YR 2/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; few pebbles; about 5 percent sand; neutral; clear smooth boundary.

Bg2—33 to 41 inches; dark gray (5Y 4/1) silty clay loam; few fine and medium prominent yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure; friable; few faint black (10YR 2/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; few

pebbles; about 5 percent sand; neutral; clear smooth boundary.

Bg3—41 to 53 inches; gray (5Y 5/1) silty clay loam; few fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few faint dark greenish gray (5GY 4/1) clay films on faces of peds; many fine and medium stains and concretions of iron and manganese oxide; few pebbles; about 5 percent sand; neutral; clear smooth boundary.

Cg—53 to 60 inches; gray (5Y 5/1) silty clay loam; few thin strata of clay loam; common fine and medium distinct light gray (5Y 6/1) and common fine and medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few faint black (10YR 2/1) clay films in root channels; common fine and medium stains and concretions of iron and manganese oxide; few pebbles; about 5 percent sand; neutral.

The thickness of the solum ranges from 36 to 55 inches. The mollic epipedon ranges from 24 to 36 inches in thickness.

The Ap and A horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has chroma of 0 to 2. It is silty clay loam or clay loam. The Cg horizon is silty clay loam or clay loam. It has thin strata containing more sand in some pedons.

Shiloh Series

The Shiloh series consists of very poorly drained, moderately slowly permeable soils in depressions on outwash plains and till plains. These soils formed in silty and clayey sediments. Slopes are 0 to 1 percent.

Shiloh soils are similar to Peotone and Sawmill soils and commonly are adjacent to Elburn, Ipava, Plano, Sable, and Tama soils. Peotone soils contain slightly more sand in the control section than the Shiloh soils. Sawmill soils are on flood plains and are subject to flooding. Elburn, Ipava, Plano, Sable, and Tama soils are better drained than the Shiloh soils and are slightly higher on the landscape. They have a mollic epipedon that is less than 24 inches thick.

Typical pedon of Shiloh silty clay loam, 396 feet north and 30 feet west of the southeast corner of sec. 31, T. 19 N., R. 1 E.

Ap—0 to 11 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate medium subangular blocky structure; firm; few fine pebbles; neutral; clear smooth boundary.

A—11 to 20 inches; very dark gray (N 3/0) silty clay loam, gray (N 5/0) dry; weak medium prismatic structure parting to moderate fine and medium angular blocky; firm; slightly acid; clear smooth boundary.

Bg1—20 to 28 inches; very dark gray (5Y 3/1) silty clay loam, gray (5Y 5/1) dry; weak medium prismatic structure parting to moderate medium angular blocky; firm; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg2—28 to 34 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

Bg3—34 to 46 inches; gray (5Y 5/1) silty clay loam; many fine and medium prominent light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine and medium stains and concretions of iron and manganese oxide; few black (10YR 2/1) krotovinas; neutral; clear smooth boundary.

Bg4—46 to 57 inches; gray (5Y 5/1) silty clay loam; many fine and medium prominent light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure; firm; few fine and medium stains and concretions of iron and manganese oxide; few black (10YR 2/1) krotovinas; mildly alkaline; clear smooth boundary.

Cg—57 to 60 inches; light gray (5Y 6/1) silt loam; common fine and medium prominent light olive brown (2.5Y 5/4) mottles; massive; friable; few fine stains and concretions of iron and manganese oxide along vertical cracks; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches. The content of clay in the 10- to 40-inch control section ranges from 35 to 45 percent.

The Ap and A horizons have hue of 10YR or are neutral in hue. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 2. The Cg horizon is silt loam, silty clay loam, or silty clay.

St. Charles Series

The St. Charles series consists of well drained, moderately permeable soils on stream terraces. These

soils formed in loess and in the underlying loamy outwash. Slopes range from 1 to 5 percent.

St. Charles soils are similar to Birkbeck, Camden, Rozetta, and Russell soils and commonly are adjacent to Camden and Lawson soils. Birkbeck and Russell soils formed in loess and loamy glacial till. Camden soils have a mantle of loess that is thinner than that of the St. Charles soils. They are on the steeper side slopes below the St. Charles soils. Rozetta soils formed entirely in loess. Lawson soils are on flood plains below the St. Charles soils.

Typical pedon of St. Charles silt loam, 1 to 5 percent slopes, 1,000 feet east and 3,700 feet south of the northwest corner of sec. 7, T. 19 N., R. 3 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky and some weak thin platy structure; friable; neutral; abrupt smooth boundary.

BE—7 to 18 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; many distinct dark brown (10YR 3/3) clay films and common faint brown (10YR 5/3) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—18 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate coarse subangular blocky structure; firm; many distinct brown (10YR 4/3) and common faint black (10YR 2/1) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—32 to 46 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure; firm; common distinct brown (10YR 4/3) and few faint black (10YR 2/1) clay films on faces of peds; few fine stains of manganese oxide within peds; strongly acid; clear smooth boundary.

2BC—46 to 52 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine prismatic structure; firm; few faint brown (10YR 4/3) clay films on faces of peds; about 10 percent sand; slightly acid; clear smooth boundary.

2C—52 to 60 inches; dark yellowish brown (10YR 4/4), stratified loam and sandy loam; few medium distinct light gray (10YR 6/1) mottles; massive; friable; medium acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an E horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam or silt loam. The 2BC and 2C horizons are sandy loam, silt loam, or loam. The 2BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6.

Tama Series

The Tama series consists of moderately well drained, moderately permeable soils in the uplands. These soils formed in loess. Slopes range from 1 to 5 percent.

Tama soils are similar to Broadwell, Catlin, Dana, Plano, and Proctor soils and commonly are adjacent to Ipava and Sable soils. Broadwell soils formed in loess and sandy material. Catlin and Dana soils formed in loess and glacial till. Plano and Proctor soils formed in loess and loamy outwash. Ipava soils are somewhat poorly drained and are slightly higher on the landscape than the Tama soils. Also, they have more clay in the control section. Sable soils are poorly drained and are in swales below the Tama soils.

Typical pedon of Tama silt loam, 1 to 5 percent slopes, 20 feet east and 2,046 feet south of the northwest corner of sec. 31, T. 19 N., R. 1 E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; abrupt smooth boundary.

A—6 to 12 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium angular blocky structure; friable; neutral; clear smooth boundary.

BA—12 to 18 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; few distinct very dark brown (10YR 2/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt—18 to 29 inches; brown (10YR 4/3) silty clay loam; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few distinct very dark brown (10YR 2/2) organic coatings and dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BC—29 to 47 inches; dark yellowish brown (10YR 4/4) silt loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure; friable; few distinct dark brown (10YR 3/3) clay films on faces of peds; common medium stains and concretions of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

C—47 to 60 inches; yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silt loam; massive;

friable; few fine stains and concretions of iron and manganese oxide along vertical cracks; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 3 to 6.

Thorp Series

The Thorp series consists of poorly drained, slowly permeable soils in depressions on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Slopes are 0 to 1 percent.

Thorp soils commonly are adjacent to Elburn, Plano, and Tama soils. The adjacent soils are better drained than the Thorp soils and are in higher or more sloping areas.

Typical pedon of Thorp silt loam, 1,848 feet east and 1,320 feet south of the northwest corner of sec. 22, T. 19 N., R. 1 E.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; mixed with some dark grayish brown (2.5Y 4/2) Eg material; weak fine and medium granular structure; friable; few fine concretions and stains of iron and manganese oxide within peds; medium acid; abrupt smooth boundary.

Eg—11 to 17 inches; dark grayish brown (2.5Y 4/2) silt loam; moderate thick platy structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; abrupt smooth boundary.

Btg1—17 to 26 inches; olive gray (5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films and few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Btg2—26 to 33 inches; dark gray (5Y 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Btg3—33 to 50 inches; gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure parting to moderate medium angular blocky; friable; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

2BCg—50 to 58 inches; light olive gray (5Y 6/2), stratified silt loam and loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds and very dark grayish brown (10YR 3/2) clay films in root channels; few fine concretions and stains of iron and manganese oxide within peds; few black (10YR 2/1) krotovinas; neutral; clear smooth boundary.

2Cg—58 to 60 inches; light olive gray (5Y 6/2) loam; common fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine concretions and stains of iron and manganese oxide within peds; few pebbles; slight effervescence; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 54 inches. The content of clay in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6. The 2BCg and 2Cg horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 8. They are loam, clay loam, sandy loam, or silt loam.

Formation of the Soils

Dr. Leon Follmer, associate geologist, Illinois State Geological Survey, helped prepare this section.

Soil forms through processes that act on deposited or accumulated geologic material. These processes result in features called soil characteristics. The soil characteristics at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil formed; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the parent material.

Climate and plant and animal life are the active factors of soil formation. They act directly on the parent material either in place or after relocation by water, glaciers, or wind and slowly change it into a natural body that has genetically related horizons. Relief can modify the effects of climate and plant and animal life. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil that has differentiated horizons. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless the effects of the other factors are considered.

Parent Material

Parent material is the geologic material in which a soil forms. Most of the parent material in De Witt County is a direct result of the glaciers and sediments of the Wisconsinan and Illinoian Stages *(14)*. Although the kinds of the parent material are associated with glacial deposits, their properties vary greatly, commonly because of the method of deposition. The dominant kinds of parent material in De Witt County are glacial till, glacial and stream outwash, alluvium, colluvium, and loess. Many of the soils formed in more than one of these, in particular loess and the underlying glacial drift.

Glacial till is material laid down directly by continental glaciers with a minimum of water action. It consists of clay, silt, sand, pebbles, and boulders, all of which are mixed together. The small pebbles generally have distinct edges and corners, indicating they have not been subject to intensive washing by water.

The glacial till in De Witt County was deposited during the Wisconsinan Glaciation, the most recent glaciation *(14)*. A distinct landscape feature of this glaciation is in the southwest corner of the county. Extending diagonally from northwest to southeast is the Shelbyville Moraine *(7)*. This moraine, or ridge, marks the farthest advance of the Wisconsinan Glaciation in the state. The glacial till that makes up the moraine and underlies most of the county is calcareous loam or clay loam.

Soils that formed entirely in till are generally on strongly sloping to very steep side slopes. Miami soils are an example. In most areas of the county, the glacial till is overlain by loess of varying thickness. Birkbeck, Catlin, Dana, and Russell are examples of soils that formed in loess and in the underlying glacial till.

Glacial outwash is material that was deposited by water in front of moraines or along the major streams. As the glaciers that extended into De Witt County melted, the water flowed out in front of them and across broad plains, carrying sandy, loamy, and clayey material. The size of the particles that make up outwash varies, depending on the velocity of the moving water. When the water slowed down, the coarser textured material was deposited first. The finer textured particles were carried a greater distance by more slowly moving water. Outwash deposits generally consist of layers of loamy sand, sandy loam, or loam. Some of the deposits in De Witt County were covered by loess ranging from a few inches to more than 60 inches in thickness.

Camden, Plano, Proctor, and St. Charles are examples of soils that formed in outwash. They are primarily in areas along Salt Creek and Kickapoo Creek, where waterflow has been concentrated. They are also

on outwash plains in front of moraines in the southwestern and northeastern parts of the county.

Alluvium is material that was deposited by floodwater from streams. It is silty or loamy. Alluvial areas are throughout the county. They range in width from three-quarters of a mile along Salt Creek to less than one-eighth of a mile along minor streams. Lawson, Ross, and Sawmill are examples of soils that formed in alluvium.

Colluvium is material that is similar to alluvium in composition but that was deposited by gravity at the base of slopes or by slopewash into closed depressions. The material is silty or clayey and generally is dark. Peotone soils formed in colluvial sediments.

Loess is material deposited by the wind. It consists of uniform, calcareous, silt-sized particles. The major source of the loess in De Witt County was the Illinois River Valley, although the Mississippi River Valley and many of the smaller stream valleys could also have contributed a small increment of loess. The thickness of the loess ranges from virtually zero in areas where slopes are very steep to 10 feet in the extreme southwest part of the county *(7)*. In the nearly level areas on uplands, it is 3 to 7 feet thick. Most of the soils in the county formed at least partially in loess. Ipava, Rozetta, Sable, and Tama are examples of soils that formed entirely in loess.

Plant and Animal Life

Soils are greatly affected by the type of vegetation under which they formed. The chief contribution of vegetation and biological processes to soil formation is the addition of organic material and nitrogen to the soil. The amount of organic material in the soil depends primarily on the kind of native plants that grew on the soil. The remains of the plants accumulated on or below the surface, decayed, and eventually became organic matter or humus. The roots of the plants provided channels for the downward movement of water through the soil and added organic matter as they decayed.

The native vegetation in De Witt County consisted primarily of tall prairie grasses and, to a lesser extent, deciduous hardwoods *(1)*. At the time of early settlement, about 90 percent of the county supported prairie grasses. These grasses have many fibrous roots that contributed large amounts of organic matter to the soil, especially where they were concentrated near the surface. Soils that formed under prairie vegetation have a thick, black or dark brown surface layer. They generally are in areas of low relief that are relatively undissected by drainageways. Catlin, Ipava, and Sable soils are examples.

About 10 percent of the county supported timber at the time of early settlement. The organic matter that deciduous hardwoods contributed to the soil was mainly leaf litter because the root systems of the hardwoods were less fibrous than those of grasses and generally were not so concentrated near the surface. The soils that formed under forest vegetation have a surface layer that is thinner and lighter colored than that of the prairie soils. Birkbeck, Keomah, Miami, and Rozetta soils formed under forest vegetation. They generally are on narrow ridges and on side slopes along drainageways.

Micro-organisms, earthworms, insects, and large burrowing animals that live in or on the soil have also affected soil formation. Bacteria and fungi help to decompose plant and animal remains and change them into humus. Burrowing animals, such as earthworms, cicadas, and ground squirrels, help to incorporate the humus into the soil. Humus is very important in the formation of soil structure and good tilth.

Climate

Climate is important in the formation of soils. De Witt County has a temperate, humid, continental climate that is essentially uniform throughout the county. Climatic differences within the county are too small to have caused any obvious differences among the soils. In some areas, however, the effects of climate are modified locally by relief.

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. Water from rains and melting snow seeps slowly downward through the soil and causes physical and chemical changes in the parent material. Where the water can move downward, it moves clay from the surface layer into the subsoil. The water dissolves minerals and moves them downward through the soil. This leaching has removed calcium carbonate, or free lime, from the upper layers in most of the soils in the county.

The temperature of the soil affects soil formation. When the soil is frozen, for example, many of the processes of soil formation are halted or retarded.

Climate also influences the kind and extent of plant and animal life. The climate in De Witt County has favored tall prairie grasses and deciduous hardwoods. It also has favored animal life, which decomposes dead plants and incorporates them into the soil.

Heavy, untimely rains are destructive when they fall on soils that have been exposed by farming. Early

spring rains in these areas can cause extensive erosion when the soils are partially frozen and more water runs off the surface.

More detailed information about the climate in De Witt County is given in the section "General Nature of the County."

Relief

Relief, or the local changes in elevation, has markedly affected the soils in De Witt County through its effects on runoff, infiltration, erosion, and natural drainage. Relief largely determines how much water infiltrates into the soil and how much runs off the surface. On the steeper slopes, runoff is most rapid and the rate of water infiltration is lowest. In low areas water is temporarily ponded by runoff from the adjacent slopes.

Relief also affects the natural drainage of the soil, or the depth to the seasonal high water table. Because of its effect on aeration of the soil, natural drainage in turn determines the color of the subsoil. The very poorly drained Peotone soils are in depressions. They are ponded or have a seasonal high water table near the surface in the early part of the growing season. The soil pores are essentially devoid of oxygen, and the naturally occurring iron and manganese compounds in the soils are in a reduced chemical state. The subsoil is dull gray and mottled. In the more sloping, well drained Miami soils, the seasonal high water table is generally below a depth of 6 feet. The pores in these soils have an abundant supply of oxygen, and the iron and manganese compounds are in an oxidized chemical state. The subsoil, which is brownish, appears brightly colored.

Nearly level, poorly drained soils, such as Sable soils, are less well developed than the gently sloping, moderately well drained Catlin soils. In the Sable soils, a seasonal high water table near the surface inhibits the downward movement of the products of weathering. In the Catlin soils, the seasonal high water table is farther from the surface and more of the products of weathering can be translocated.

Local relief directly determines the intensity of erosion. The hazard of erosion increases as the slope and the runoff rate increase.

Time

To a great extent, time determines the degree of profile development in a soil. The influence of time, however, is modified by wetness, erosion, the deposition of material, and local relief.

In most of the soils in De Witt County, enough time has passed to allow for the removal of calcium carbonates from the upper part of the profile. Harpster soils, however, are still calcareous in the surface layer because they are in depressions and have a seasonal high water table.

Erosion continually removes the most recently exposed material and thus tends to allow leaching to occur in fresh geologic material. The steeper soils are morphologically younger than the soils in the more stable landscape positions.

Differences in length of time that the parent material has been in place are reflected by the degree of profile development in the soil. Lawson soils are characterized by weak profile development because they are on flood plains that continue to receive recent alluvial sediments. They have not been in place long enough for the formation of distinct horizons. Rozetta soils are more strongly developed and have distinct horizons because the loess in which they formed has been in place much longer than the parent material of the Lawson soils.

References

(1) Anonymous. 1882. History of De Witt County, Illinois. W.R. Brink & Co., Philadelphia, Pennsylvania, 355 pp., illus.

(2) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(3) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(4) Anderson, C.D., and others. 1984. Illinois agronomy handbook. Univ. of Ill., Coop. Ext. Serv., 96 pp., illus.

(5) Clinton & De Witt County History Book Committee. 1985. Clinton and De Witt County, Illinois, 1835-1985. Kes-Print, Inc., Shawnee Mission, Kansas. 544 pp., illus.

(6) Fehrenbacher, J.B., R.A. Pope, I.J. Jansen, J.D. Alexander, and B.W. Ray. 1978. Soil productivity in Illinois. Univ. of Ill., Coll. of Agric., Coop. Ext. Serv. Circ. 1156, 21 pp., illus.

(7) Hunt, Cathy S., and John P. Kempton. 1977. Geology for planning in De Witt County, Illinois. Ill. State Geol. Surv., Environ. Geol. Note 83, 28 pp., illus.

(8) Smith, Guy D., and L.H. Smith. 1940. De Witt County soils. Univ. of Ill., Agric. Exp. Stn. Soil Rep. 67, 28 pp., illus.

(9) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(10) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(11) United States Department of Agriculture. 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1, 63 pp., illus.

(12) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(13) United States Department of Commerce, Bureau of the Census. 1984. 1982 census of agriculture. Vol. I, Part 13.

(14) Willman, H.B., and others. 1975. Handbook of Illinois stratigraphy. Ill. State Geol. Surv. Bull. 95, 261 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium

carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that

follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway,

typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually

expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that

vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material).

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range in moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The

degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an

arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{+} + Mg^{++}. The degrees of sodicity and their respective ratios are—

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediments of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its

equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Decatur, Illinois)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	34.5	17.1	25.8	38	13	1	2.03	0.95	2.96	5	6.8
February----	39.9	21.4	30.7	45	17	4	2.03	1.13	2.83	5	5.4
March--------	50.5	30.4	40.5	55	28	42	3.48	1.97	4.82	7	4.1
April--------	65.3	42.4	53.9	68	40	192	4.13	2.29	5.76	8	.5
May----------	75.9	52.1	64.0	79	48	445	4.09	2.02	5.90	7	.0
June---------	84.8	61.0	72.9	88	58	696	4.48	1.97	6.63	6	.0
July---------	88.0	65.1	76.6	91	63	830	4.17	1.82	6.16	6	.0
August-------	86.1	63.1	74.6	87	61	770	3.69	1.65	5.43	6	.0
September---	80.7	55.7	68.2	83	53	554	3.21	.86	5.09	5	.0
October-----	68.6	44.3	56.5	72	41	249	2.63	1.10	3.92	5	.0
November----	52.2	33.0	42.6	56	31	52	2.56	1.35	3.62	5	2.1
December----	39.9	23.3	31.6	44	19	6	2.62	.97	3.99	5	5.1
Yearly:											
Average---	63.9	42.4	53.2	---	---	---	---	---	---	70	24.0
Extreme---	---	---	---	113	-23	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,841	39.12	18.08	57.11	---	---

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 13	Mar. 21	Apr. 4
2 years in 10 later than--	Mar. 22	Mar. 31	Apr. 15
5 years in 10 later than--	Mar. 29	Apr. 9	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 8	Oct. 3
2 years in 10 earlier than--	Oct. 26	Oct. 13	Oct. 5
5 years in 10 earlier than--	Nov. 4	Oct. 26	Oct. 16

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	199	180	150
8 years in 10	206	186	158
5 years in 10	219	200	173
2 years in 10	232	213	188
1 year in 10	239	219	196

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
17	Keomah silt loam	3,605	1.4
27D2	Miami loam, 10 to 15 percent slopes, eroded	3,255	1.3
27E	Miami loam, 15 to 30 percent slopes	5,690	2.2
27G	Miami silt loam, 30 to 50 percent slopes	2,700	1.0
36B	Tama silt loam, 1 to 5 percent slopes	14,535	5.6
43	Ipava silt loam	45,345	17.6
45	Denny silt loam	275	0.1
56B2	Dana silt loam, 2 to 6 percent slopes, eroded	2,980	1.2
67	Harpster silty clay loam	2,940	1.1
68	Sable silty clay loam	69,100	26.8
73	Ross loam	310	0.1
107	Sawmill silty clay loam	5,365	2.1
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	575	0.2
138	Shiloh silty clay loam	200	0.1
148B2	Proctor silt loam, 2 to 6 percent slopes, eroded	310	0.1
171B2	Catlin silty clay loam, 2 to 5 percent slopes, eroded	46,090	17.8
171C2	Catlin silty clay loam, 5 to 10 percent slopes, eroded	1,545	0.6
198	Elburn silt loam	2,150	0.8
199A	Plano silt loam, 0 to 2 percent slopes	1,045	0.4
199B2	Plano silt loam, 2 to 5 percent slopes, eroded	1,310	0.5
206	Thorp silt loam	515	0.2
221C2	Parr silt loam, 5 to 10 percent slopes, eroded	1,180	0.5
233B	Birkbeck silt loam, 1 to 4 percent slopes	17,130	6.6
233C2	Birkbeck silt loam, 4 to 8 percent slopes, eroded	2,095	0.8
243B	St. Charles silt loam, 1 to 5 percent slopes	1,280	0.5
244	Hartsburg silty clay loam	3,870	1.5
279B	Rozetta silt loam, 1 to 5 percent slopes	1,550	0.6
322C2	Russell silt loam, 5 to 10 percent slopes, eroded	6,900	2.7
322D3	Russell silty clay loam, 10 to 15 percent slopes, severely eroded	865	0.3
330	Peotone silty clay loam	525	0.2
415	Orion silt loam	555	0.2
451	Lawson silt loam	5,270	2.0
533	Urban land	375	0.1
683	Lawndale silt loam	275	0.1
684B	Broadwell silt loam, 2 to 5 percent slopes	265	0.1
802B	Orthents, loamy, gently sloping	1,260	0.5
802D	Orthents, loamy, strongly sloping	225	0.1
865	Pits, gravel	50	*
	Water	5,250	2.0
	Total	258,760	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
17	Keomah silt loam (where drained)
36B	Tama silt loam, 1 to 5 percent slopes
43	Ipava silt loam
45	Denny silt loam (where drained)
56B2	Dana silt loam, 2 to 6 percent slopes, eroded
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
73	Ross loam
107	Sawmill silty clay loam (where drained)
138	Shiloh silty clay loam (where drained)
148B2	Proctor silt loam, 2 to 6 percent slopes, eroded
171B2	Catlin silty clay loam, 2 to 5 percent slopes, eroded
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B2	Plano silt loam, 2 to 5 percent slopes, eroded
206	Thorp silt loam (where drained)
233B	Birkbeck silt loam, 1 to 4 percent slopes
243B	St. Charles silt loam, 1 to 5 percent slopes
244	Hartsburg silty clay loam (where drained)
279B	Rozetta silt loam, 1 to 5 percent slopes
330	Peotone silty clay loam (where drained)
415	Orion silt loam
451	Lawson silt loam
683	Lawndale silt loam
684B	Broadwell silt loam, 2 to 5 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
17 Keomah	IIw	131	44	52	5.1	8.0
27D2 Miami	IVe	110	36	45	4.3	7.2
27E Miami	VIe	---	---	---	3.7	6.2
27G Miami	VIIe	---	---	---	---	---
36B Tama	IIe	153	46	61	5.8	9.7
43 Ipava	I	163	52	66	6.1	10.1
45 Denny	IIIw	113	37	47	---	---
56B2 Dana	IIe	134	42	56	5.2	8.6
67 Harpster	IIw	136	44	52	---	---
68 Sable	IIw	156	51	61	---	---
73 Ross	IIw	145	46	60	5.5	9.1
107 Sawmill	IIw	147	47	54	---	---
134C2 Camden	IIIe	117	37	52	4.7	7.8
138 Shiloh	IIw	139	46	56	---	---
148B2 Proctor	IIe	138	42	57	5.3	8.8
171B2 Catlin	IIe	144	44	59	5.6	9.3
171C2 Catlin	IIIe	141	43	57	5.5	9.1
198 Elburn	I	161	50	63	6.1	10.2
199A Plano	I	151	45	60	5.8	9.7

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
199B2---------------------- Plano	IIe	145	43	58	5.4	9.3
206------------------------ Thorp	IIw	126	42	51	---	---
221C2---------------------- Parr	IIIe	117	40	52	4.8	8.0
233B----------------------- Birkbeck	IIe	122	41	54	4.9	8.2
233C2---------------------- Birkbeck	IIIe	116	38	52	4.7	7.8
243B----------------------- St. Charles	IIe	126	39	55	5.0	8.1
244------------------------ Hartsburg	IIw	145	47	56	---	---
279B----------------------- Rozetta	IIe	130	40	53	5.1	8.6
322C2---------------------- Russell	IIIe	114	37	40	4.4	7.3
322D3---------------------- Russell	VIe	---	---	---	3.4	5.7
330------------------------ Peotone	IIw	123	42	43	---	---
415------------------------ Orion	IIw	135	43	52	4.7	7.8
451------------------------ Lawson	IIw	161	48	62	5.7	9.5
533**. Urban land						
683------------------------ Lawndale	I	156	50	62	5.8	9.7
684B----------------------- Broadwell	IIe	144	44	58	5.3	9.2
802B, 802D. Orthents						
865**. Pits						

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)	
		Erosion (e)	Wetness (w)
		Acres	Acres
I	48,815	---	---
II	177,705	85,450	92,255
III	12,570	12,295	275
IV	3,255	3,255	---
V	---	---	---
VI	6,555	6,555	---
VII	2,700	2,700	---
VIII	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
27D2------------ Miami	5A	Slight	Slight	Slight	Slight	White oak-----------	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar-------	98	104	
						Sweetgum------------	76	70	
27E------------- Miami	5R	Moderate	Moderate	Slight	Slight	White oak-----------	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar-------	98	104	
						Sweetgum------------	76	70	
27G------------- Miami	5R	Severe	Severe	Slight	Slight	White oak-----------	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar-------	98	104	
						Sweetgum------------	76	70	
73-------------- Ross	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	68	Eastern white pine, black walnut, white ash, Norway spruce, yellow poplar.
						Yellow poplar-------	96	100	
						Sugar maple---------	85	52	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash-----------	---	---	
107------------- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
233C2----------- Birkbeck	5A	Slight	Slight	Slight	Slight	White oak-----------	86	68	White oak, northern red oak, green ash, black walnut, eastern white pine, red pine, Scotch pine.
						Northern red oak----	---	---	
						Green ash-----------	---	---	
279B------------ Rozetta	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Eastern white pine, northern red oak, green ash, Scotch pine, yellow poplar.
						Northern red oak----	80	62	
						Yellow poplar-------	90	90	
						Black walnut--------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
322D3----------- Russell	5A	Slight	Slight	Slight	Slight	White oak-----------	90	72	Eastern white pine, white ash, yellow poplar, black walnut, white oak, northern red oak, green ash, black cherry.
						Northern red oak----	90	72	
						Yellow poplar-------	96	100	
						Sweetgum------------	76	70	
415------------- Orion	2W	Slight	Moderate	Slight	Slight	Silver maple--------	80	34	White spruce, silver maple, white ash, eastern cottonwood.
						Red maple-----------	---	---	
						White ash-----------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
17. Keomah	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
27D2. Miami	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36B. Tama	---	American cranberrybush, American plum, common chokecherry, silky dogwood.	Blue spruce, eastern arborvitae, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
43. Ipava	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce	Eastern white pine, pin oak.
45. Denny	---	Silky dogwood, American cranberrybush, nannyberry.	Austrian pine, eastern arborvitae, Norway spruce, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
56B2. Dana	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
67. Harpster	Redosier dogwood.	Nannyberry viburnum, Washington hawthorn, blackhaw, common chokecherry.	White spruce, eastern arborvitae, eastern redcedar, green ash, Osageorange, hackberry.	Baldcypress	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
68----------------- Sable	---	Silky dogwood, American cranberrybush, nannyberry.	Washington hawthorn, white fir, blue spruce, eastern arborvitae, Austrian pine, Norway spruce, green ash.	Eastern white pine	Pin oak.
73----------------- Ross	---	Silky dogwood, American cranberrybush.	Washington hawthorn, eastern arborvitae, blue spruce, white fir, Austrian pine, nannyberry, green ash.	Norway spruce-----	Pin oak, eastern white pine.
107---------------- Sawmill	---	American cranberrybush, silky dogwood, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
134C2-------------- Camden	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
138---------------- Shiloh	---	American cranberrybush, silky dogwood, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
148B2-------------- Proctor	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
171B2, 171C2------ Catlin	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Washington hawthorn, eastern arborvitae, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
198. Elburn	---	Silky dogwood, American cranberrybush.	Austrian pine, white fir, eastern arborvitae, Washington hawthorn, blue spruce, nannyberry, green ash.	Norway spruce	Eastern white pine, pin oak.
199A, 199B2. Plano	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Washington hawthorn, eastern arborvitae, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
206. Thorp	---	Silky dogwood, American cranberrybush, nannyberry.	Washington hawthorn, white fir, blue spruce, eastern arborvitae, Austrian pine, Norway spruce, green ash.	Eastern white pine	Pin oak.
221C2. Parr	---	American plum, American cranberrybush, silky dogwood, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
233B, 233C2. Birkbeck	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
243B. St. Charles	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
244. Hartsburg	Redosier dogwood	Silky dogwood, blackhaw, common chokecherry.	Washington hawthorn, eastern arborvitae, green ash, Osageorange, white spruce, eastern redcedar, hackberry.	Baldcypress	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
279B Rozetta	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
322C2, 322D3 Russell	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
330 Peotone	---	Silky dogwood, American cranberrybush, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
415 Orion	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce	Eastern white pine, pin oak.
451 Lawson	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce	Eastern white pine, pin oak.
683 Lawndale	---	Silky dogwood, American cranberrybush.	Washington hawthorn, eastern arborvitae, blue spruce, white fir, Austrian pine, nannyberry, green ash.	Norway spruce	Pin oak, eastern white pine.
684B Broadwell	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.

TABLE 10.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17-------------------- Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight----------	Slight.
27D2------------------ Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27E------------------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
27G------------------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
36B------------------- Tama	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
43-------------------- Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45-------------------- Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
56B2------------------ Dana	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
67-------------------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68-------------------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
73-------------------- Ross	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
107------------------- Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
134C2----------------- Camden	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
138------------------- Shiloh	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
148B2----------------- Proctor	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
171B2----------------- Catlin	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
171C2----------------- Catlin	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
198------------------- Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
199A: Plano	Slight	Slight	Slight	Slight	Slight.
199B2: Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
206: Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
221C2: Parr	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
233B: Birkbeck	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
233C2: Birkbeck	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
243B: St. Charles	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
244: Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
279B: Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
322C2: Russell	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
322D3: Russell	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
330: Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
415: Orion	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
451: Lawson	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
533*. Urban land					
683: Lawndale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
684B: Broadwell	Slight	Slight	Moderate: slope.	Slight	Slight.
802B, 802D. Orthents					
865*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
17: Keomah	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
27D2, 27E: Miami	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
27G: Miami	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
36B: Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43: Ipava	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45: Denny	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
56B2: Dana	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
67: Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
68: Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
73: Ross	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
107: Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
134C2: Camden	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Poor.
138: Shiloh	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
148B2: Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
171B2: Catlin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
171C2: Catlin	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
198: Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B2: Plano	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
206: Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
221C2-------------- Parr	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
233B--------------- Birkbeck	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233C2-------------- Birkbeck	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
243B--------------- St. Charles	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
244---------------- Hartsburg	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
279B--------------- Rozetta	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
322C2-------------- Russell	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
322D3. Russell									
330---------------- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
415---------------- Orion	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
451---------------- Lawson	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
533*. Urban land									
683---------------- Lawndale	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
684B--------------- Broadwell	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
802B, 802D. Orthents									
865*. Pits									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17: Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
27D2: Miami	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27E, 27G: Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
36B: Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
43: Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
45: Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
56B2: Dana	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
73: Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
107: Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
134C2: Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
138--------------- Shiloh	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
148B2------------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
171B2------------- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
171C2------------- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
198--------------- Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B2------- Plano	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
206--------------- Thorp	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
221C2------------- Parr	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
233B-------------- Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
233C2------------- Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
243B-------------- St. Charles	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
244--------------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
279B-------------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
322C2------------- Russell	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
322D3------------- Russell	Moderate: dense layer, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
330---------------- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
415---------------- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
451---------------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
533*. Urban land						
683---------------- Lawndale	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
684B--------------- Broadwell	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
802B, 802D. Orthents						
865*. Pits						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
17: Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
27D2: Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
27E, 27G: Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36B: Tama	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
43: Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
45: Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
56B2: Dana	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
73: Ross	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
107: Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
134C2: Camden	Slight	Severe: slope.	Severe: seepage.	Slight	Fair: too clayey.
138: Shiloh	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
148B2: Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too sandy.	Slight	Poor: too sandy.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
171B2: Catlin	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
171C2: Catlin	Severe: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
198: Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A: Plano	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
199B2: Plano	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
206: Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
221C2: Parr	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
233B, 233C2: Birkbeck	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
243B: St. Charles	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
244: Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
279B: Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
322C2: Russell	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
322D3: Russell	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
330: Peotone	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
415: Orion	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
451: Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
533*. Urban land					
683----------------- Lawndale	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: hard to pack, wetness.
684B---------------- Broadwell	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-- --------	Fair: too clayey, thin layer.
802B, 802D. Orthents					
865*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17 Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
27D2 Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
27E Miami	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
27G Miami	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36B Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43 Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
45 Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
56B2 Dana	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
67 Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68 Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
73 Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
134C2 Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
138 Shiloh	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
148B2 Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
171B2, 171C2 Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
198. Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B2. Plano	Good.	Improbable: excess fines.	Improbable: excess fines.	Good.
206. Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
221C2. Parr	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
233B, 233C2. Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
243B. St. Charles	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
244. Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
279B. Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
322C2. Russell	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
322D3. Russell	Good.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
330. Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
415. Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
451. Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
533*. Urban land				
683. Lawndale	Fair: wetness.	Probable.	Improbable: too sandy.	Good.
684B. Broadwell	Good.	Probable.	Improbable: too sandy.	Good.
802B, 802D. Orthents				
865*. Pits				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
17 Keomah	Slight	Severe: hard to pack.	Frost action, percs slowly.	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
27D2, 27E, 27G Miami	Severe: slope.	Severe: piping.	Deep to water	Slope, rooting depth.	Slope, erodes easily.	Slope, erodes easily, rooting depth.
36B Tama	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
43 Ipava	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
45 Denny	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
56B2 Dana	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Slope	Erodes easily	Erodes easily.
67 Harpster	Moderate: seepage.	Severe: ponding, piping.	Ponding, frost action.	Ponding	Ponding	Wetness.
68 Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
73 Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
107 Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
134C2 Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
138 Shiloh	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
148B2 Proctor	Severe: seepage.	Severe: piping.	Deep to water	Slope	Erodes easily, too sandy.	Erodes easily.
171B2, 171C2 Catlin	Moderate: seepage, slope.	Moderate: wetness.	Deep to water	Slope	Erodes easily	Erodes easily.
198 Elburn	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
199A Plano	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Erodes easily	Erodes easily.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
199B2 Plano	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.
206 Thorp	Severe: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
221C2 Parr	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Favorable	Rooting depth, percs slowly.
233B Birkbeck	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
233C2 Birkbeck	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
243B St. Charles	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
244 Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
279B Rozetta	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
322C2 Russell	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
322D3 Russell	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
330 Peotone	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
415 Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
451 Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
683 Lawndale	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
684B Broadwell	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
17---------------- Keomah	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-43	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	43-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
27D2------------- Miami	0-5	Loam-------------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	5-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
27E-------------- Miami	0-11	Loam-------------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	11-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
27G-------------- Miami	0-11	Silt loam--------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	11-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
36B-------------- Tama	0-12	Silt loam--------	ML, CL	A-6, A-7	0	100	100	100	95-100	35-45	10-20
	12-29	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	29-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
43--------------- Ipava	0-13	Silt loam--------	ML, CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	13-55	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	55-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-20
45--------------- Denny	0-9	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	9-20	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	20-30	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
	30-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	25-40	11-20
56B2------------- Dana	0-8	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-95	30-35	8-12
	8-30	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-98	38-50	20-32
	30-43	Clay loam--------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	37-50	17-30
	43-60	Loam, clay loam	CL, ML, CL-ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	17-30	2-14
67--------------- Harpster	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	15-40	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	40-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
68 Sable	0-17	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	17-50	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	50-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
73 Ross	0-14	Loam	ML, CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-95	20-35	NP-12
	14-37	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	90-100	85-100	70-100	55-95	22-45	3-20
	37-60	Stratified sandy loam to silt loam.	CL, ML, SM, SC	A-6, A-4, A-2	0-5	100	75-100	50-100	25-80	<30	NP-12
107 Sawmill	0-26	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	26-53	Silty clay loam, clay loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	53-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
134C2 Camden	0-4	Silt loam	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	4-30	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	90-100	25-40	15-25
	30-45	Loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	45-60	Stratified loamy sand to silt loam.	SM, SC, ML, CL	A-2, A-4	0-5	90-100	80-100	50-80	20-60	<25	3-10
138 Shiloh	0-20	Silty clay loam	CL	A-7	0	100	100	95-100	90-100	40-50	15-25
	20-57	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	40-65	15-40
	57-60	Silty clay loam, silty clay, silt loam.	CL	A-7, A-6	0	100	100	95-100	90-100	30-50	15-30
148B2 Proctor	0-9	Silt loam	CL	A-6	0	100	100	95-100	85-100	25-40	10-20
	9-22	Silty clay loam	CL	A-7, A-6	0	95-100	90-100	85-100	85-100	25-50	10-25
	22-42	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SM-SC	A-6, A-7, A-4, A-2	0	90-100	85-100	75-100	30-80	20-45	5-25
	42-60	Stratified silt loam to loamy sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20
171B2, 171C2 Catlin	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	85-100	35-50	10-20
	8-41	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	90-100	90-100	80-100	35-50	20-30
	41-60	Loam, clay loam, silt loam.	CL	A-6, A-7	0	90-100	90-100	85-100	60-100	25-45	10-20
198 Elburn	0-14	Silt loam	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	14-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	44-60	Loam, sandy loam, silt loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
199A, 199B2------ Plano	0-13	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	13-44	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	44-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	85-95	60-90	30-70	<25	NP-10
206-------------- Thorp	0-11	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	8-19
	11-17	Silt loam--------	CL	A-4, A-6	0	95-100	95-100	90-100	75-95	25-35	7-15
	17-50	Silty clay loam	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	50-60	Silt loam, clay loam, loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
221C2------------ Parr	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-100	50-90	15-30	4-15
	8-35	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	90-100	90-100	75-100	50-95	25-35	9-15
	35-39	Loam-------------	CL	A-6, A-4	0	90-100	90-100	75-85	50-65	25-35	8-15
	39-60	Loam-------------	CL, ML, CL-ML	A-4	0-3	85-95	85-95	75-85	50-65	<25	3-8
233B, 233C2------ Birkbeck	0-3	Silt loam--------	CL, ML	A-4, A-6, A-7	0	100	100	95-100	95-100	28-45	5-15
	3-7	Silt loam--------	CL, ML	A-4, A-6	0	100	100	100	95-100	30-40	7-15
	7-52	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-100	30-50	10-25
	52-60	Loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-5	95-100	85-100	70-100	55-80	25-40	5-20
243B------------- St. Charles	0-7	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	22-35	7-15
	7-46	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
	46-52	Loam, silt loam, sandy loam.	CL, SC	A-4, A-6	0	90-100	75-100	75-95	40-80	20-35	8-20
	52-60	Stratified sandy loam to silt loam.	SC, CL, CL-ML, SM-SC	A-2, A-4, A-6	0-5	90-100	75-90	60-90	30-70	15-35	5-15
244-------------- Hartsburg	0-14	Silty clay loam	CL, ML	A-7, A-6	0	100	100	100	95-100	35-50	10-25
	14-27	Silty clay loam	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	27-60	Silt loam, loam	CL	A-6	0	95-100	90-100	90-100	70-100	25-40	11-20
279B------------- Rozetta	0-5	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	5-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	10-42	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	42-60	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20
322C2------------ Russell	0-6	Silt loam--------	CL-ML, CL, ML	A-4	0	100	100	90-100	70-90	<25	3-8
	6-25	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-20
	25-44	Clay loam, loam	CL	A-6	0	95-100	90-95	80-95	60-80	30-35	10-15
	44-60	Clay loam, loam	CL-ML, CL	A-4	0-3	85-95	80-90	65-90	50-75	<25	4-8
322D3------------ Russell	0-3	Silty clay loam	CL	A-6	0	100	100	90-100	80-95	30-40	10-20
	3-29	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-20
	29-47	Clay loam, loam	CL	A-6	0	95-100	90-95	80-95	60-80	30-35	10-15
	47-60	Clay loam, loam	CL-ML, CL	A-4	0-3	85-95	80-90	65-90	50-75	<25	4-8

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
330-------------- Peotone	0-22	Silty clay loam	CH, CL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	22-47	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	40-70	15-40
	47-60	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	15-30
415-------------- Orion	0-8	Silt loam--------	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	8-38	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	38-52	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
	52-60	Stratified silt loam to sand.	CL, CL-ML	A-4	0	80-100	80-100	80-100	80-100	20-30	4-10
451-------------- Lawson	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	85-100	20-40	5-20
	8-30	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	30-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	60-100	20-45	10-25
533*. Urban land											
683-------------- Lawndale	0-14	Silt loam--------	CL	A-6, A-7, A-4	0	100	100	100	95-100	25-45	8-25
	14-50	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7	0	100	100	100	95-100	40-55	15-25
	50-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SM-SC, SP	A-2, A-3	0	100	100	75-95	4-35	<20	NP-5
684B------------- Broadwell	0-16	Silt loam--------	ML, CL	A-6, A-7, A-4	0	100	100	90-100	85-100	30-45	5-20
	16-51	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-25
	51-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SP, SM-SC	A-3, A-2	0	100	100	75-95	4-35	<20	NP-5
802B, 802D. Orthents											
865*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
17-------------- Keomah	0-12	16-22	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	3	6	1-2
	12-43	27-42	1.30-1.45	0.06-0.6	0.18-0.20	4.5-5.5	High---------	0.37			
	43-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.37			
27D2------------- Miami	0-5	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	4	5	.5-1
	5-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low----------	0.37			
	49-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27E-------------- Miami	0-11	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	4	5	.5-3
	11-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low----------	0.37			
	49-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Moderate-----	0.37			
27G-------------- Miami	0-11	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	4	5	.5-3
	11-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low----------	0.37			
	49-60	15-30	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate-----	0.37			
36B-------------- Tama	0-12	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
	12-29	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	29-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
43--------------- Ipava	0-13	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	13-55	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	55-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
45--------------- Denny	0-9	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	3	6	3-4
	9-20	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.6-7.3	Low----------	0.37			
	20-30	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-7.3	High---------	0.37			
	30-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.8	Moderate-----	0.37			
56B2------------- Dana	0-8	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	2-4
	8-30	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	30-43	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.3	Moderate-----	0.43			
	43-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low----------	0.43			
67--------------- Harpster	0-15	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
	15-40	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	40-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
68--------------- Sable	0-17	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	5-6
	17-50	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	50-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.28			
73--------------- Ross	0-14	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low----------	0.32	5	5	3-4
	14-37	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low----------	0.32			
	37-60	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low----------	0.32			
107-------------- Sawmill	0-26	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	26-53	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	53-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
134C2------------ Camden	0-4	14-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	.5-1
	4-30	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	30-45	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low----------	0.37			
	45-60	5-20	1.55-1.75	0.6-6.0	0.11-0.22	5.6-8.4	Low----------	0.37			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
138-------------- Shiloh	0-20	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.1-7.3	High---------	0.28	5	7	4-6
	20-57	35-45	1.35-1.55	0.2-0.6	0.09-0.18	6.1-7.8	High---------	0.28			
	57-60	25-45	1.30-1.50	0.2-0.6	0.18-0.20	6.1-8.4	High---------	0.28			
148B2------------ Proctor	0-9	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.32	5	6	3-4
	9-22	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	22-42	22-35	1.30-1.55	0.6-6.0	0.13-0.16	5.6-7.3	Moderate-----	0.43			
	42-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.8	Low-----------	0.43			
171B2, 171C2----- Catlin	0-8	27-30	1.15-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	1-3
	8-41	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	41-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low-----------	0.43			
198-------------- Elburn	0-14	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low-----------	0.28	5	6	4-5
	14-44	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	44-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low-----------	0.43			
199A, 199B2------ Plano	0-13	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low-----------	0.32	5-4	6	3-5
	13-44	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	44-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low-----------	0.43			
206-------------- Thorp	0-11	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low-----------	0.37	5	6	2-4
	11-17	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-7.3	Low-----------	0.37			
	17-50	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	50-60	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate-----	0.37			
221C2------------ Parr	0-8	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.32	4	5	2-4
	8-35	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.32			
	35-39	20-25	1.55-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Moderate-----	0.32			
	39-60	10-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low-----------	0.32			
233B, 233C2------ Birkbeck	0-3	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	.5-3
	3-7	15-27	1.25-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low-----------	0.37			
	7-52	25-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-7.3	Moderate-----	0.37			
	52-60	20-30	1.40-1.60	0.2-0.6	0.14-0.20	5.6-7.8	Low-----------	0.37			
243B------------- St. Charles	0-7	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.37	5-4	6	1-3
	7-46	25-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	46-52	15-27	1.30-1.50	0.6-2.0	0.11-0.16	5.1-7.3	Low-----------	0.37			
	52-60	10-25	1.55-1.75	0.6-2.0	0.11-0.16	5.6-8.4	Low-----------	0.37			
244-------------- Hartsburg	0-14	27-33	1.15-1.35	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	7	3-5
	14-27	27-35	1.20-1.50	0.6-2.0	0.18-0.20	6.6-8.4	Moderate-----	0.28			
	27-60	20-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.28			
279B------------- Rozetta	0-5	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
	5-10	12-27	1.20-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.37			
	10-42	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37			
	42-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
322C2------------ Russell	0-6	10-20	1.30-1.45	0.6-2.0	0.22-0.24	6.1-6.5	Low-----------	0.37	5	5	.5-1
	6-25	27-35	1.35-1.50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	25-44	22-32	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.37			
	44-60	27-30	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low-----------	0.37			
322D3------------ Russell	0-3	27-35	1.30-1.45	0.6-2.0	0.18-0.20	6.1-6.5	Moderate-----	0.37	4	7	<.5
	3-29	27-35	1.35-1.50	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	29-47	22-32	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.37			
	47-60	12-20	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low-----------	0.37			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
330---------------- Peotone	0-22	33-40	1.20-1.40	0.2-0.6	0.21-0.23	5.6-7.8	High----------	0.28	5	4	5-7
	22-47	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High----------	0.28			
	47-60	25-40	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High----------	0.28			
415---------------- Orion	0-8	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low-----------	0.37	5	5	1-3
	8-38	18-26	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
	38-52	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low-----------	0.37			
	52-60	10-18	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low-----------	0.37			
451---------------- Lawson	0-8	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low-----------	0.28	5	5	3-5
	8-30	18-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low-----------	0.28			
	30-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate------	0.43			
533*. Urban land											
683---------------- Lawndale	0-14	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	2-4
	14-50	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate------	0.43			
	50-60	3-10	1.50-1.85	2.0-20	0.05-0.10	5.6-7.3	Low-----------	0.15			
684B--------------- Broadwell	0-16	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	2-4
	16-51	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate------	0.43			
	51-60	3-10	1.20-2.00	6.0-20	0.05-0.09	5.6-7.3	Low-----------	0.15			
802B, 802D. Orthents											
865*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
17----------------- Keomah	C	None---------	---	---	2.0-4.0	Apparent	Nov-Jul	High-----	High-----	Moderate.
27D2, 27E, 27G---- Miami	B	None---------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
36B--------------- Tama	B	None---------	---	---	4.0-6.0	Apparent	Nov-Jun	High-----	Moderate	Moderate.
43----------------- Ipava	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
45----------------- Denny	D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
56B2-------------- Dana	B	None---------	---	---	3.0-6.0	Perched	Mar-Apr	High-----	Moderate	Moderate.
67----------------- Harpster	B/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	High-----	High-----	Low.
68----------------- Sable	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
73----------------- Ross	B	Occasional	Very brief	Mar-May	4.0-6.0	Apparent	Feb-Apr	Moderate	Low------	Low.
107---------------- Sawmill	B/D	Occasional	Brief-----	Mar-May	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
134C2------------- Camden	B	None---------	---	---	>6.0	---	---	High-----	Low------	Moderate.
138---------------- Shiloh	B/D	None---------	---	---	+1-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
148B2------------- Proctor	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
171B2, 171C2------ Catlin	B	None---------	---	---	3.5-6.0	Apparent	Feb-May	High-----	High-----	Moderate.
198---------------- Elburn	B	None---------	---	---	1.0-3.0	Apparent	Jan-May	High-----	High-----	Moderate.
199A, 199B2------- Plano	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Low.
206---------------- Thorp	C/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	High-----	High-----	Moderate.
221C2------------- Parr	B	None---------	---	---	>6.0	---	---	Moderate	High-----	Moderate.
233B, 233C2------- Birkbeck	B	None---------	---	---	3.0-6.0	Apparent	Mar-May	High-----	High-----	Moderate.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
243B-------------- St. Charles	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
244--------------- Hartsburg	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
279B-------------- Rozetta	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	High-----	Moderate	Moderate.
322C2, 322D3------ Russell	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
330--------------- Peotone	B/D	None---------	---	---	+.5-1.0	Apparent	Feb-Jul	High-----	High-----	Moderate.
415--------------- Orion	C	Occasional	Brief-----	Mar-May	1.0-3.0	Apparent	Nov-May	High-----	High-----	Low.
451--------------- Lawson	C	Occasional	Brief-----	Mar-May	1.0-3.0	Apparent	Nov-May	High-----	Moderate	Low.
533*. Urban land										
683--------------- Lawndale	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
684B-------------- Broadwell	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
802B, 802D. Orthents										
865*. Pits										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name and location	Sample number	Horizon	Depth	Moisture density MAX	Moisture density OPT	Percentage passing sieve-- No. 4	No. 10	No. 40	No. 200	LL	PI	Classification AASHTO	Classification UN
			In	Lb/cu ft	Pct					Pct			
Catlin silty clay loam:													
	84IL-039-												
627 feet west and	11-1	Ap	0-8	101	20	100	100	99	98	37	14	A-6(15)	CL
462 feet south of	11-3	Bt2	14-21	92	24	100	100	100	99	44	20	A-7-6(22)	CL
the northeast	11-7	BC	41-46	115	14	100	100	87	68	31	14	A-6(7)	CL
corner of sec. 6,													
T. 20 N., R. 3 E.													
Ipava silt loam:	83IL-039-												
86 feet east and	15-1	Ap	0-7	104	19	99	99	97	93	33	11	A-6(11)	CL
3,600 feet south of	15-4	Bt1, Btg1	18-32	94	21	100	100	100	99	52	27	A-7-6(31)	CH
the northwest corner	15-5												
of sec. 10,	15-7	Cg	55-60	109	17	100	100	99	98	30	8	A-4(8)	CL
T. 20 N., R. 3 E.													
Miami silt loam:	83IL-039-												
1,056 feet east and	8-4	Bt1	11-21	113	14	98	96	89	65	30	14	A-6(6)	CL
1,782 feet north of	8-8	C	49-60	117	14	97	95	89	65	27	13	A-6(5)	CL
the southwest corner													
of sec. 26,													
T. 20 N., R. 3 E.													
Russell silt loam:	83IL-039-												
2,900 feet north and	18-4	Bt2	16-25	102	21	100	100	100	98	42	21	A-7-6(22)	CL
1,100 feet west of	18-5	2Bt3	25-36	109	17	100	100	98	83	35	16	A-6(12)	CL
the southeast corner	18-7	C	44-60	118	14	97	95	90	64	30	14	A-6(6)	CL
of sec. 32,													
T. 20 N., R. 3 E.													

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Birkbeck	Fine-silty, mixed, mesic Typic Hapludalfs
Broadwell	Fine-silty, mixed, mesic Typic Argiudolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
*Catlin	Fine-silty, mixed, mesic Typic Argiudolls
*Dana	Fine-silty, mixed, mesic Typic Argiudolls
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Lawndale	Fine-silty, mixed, mesic Aquic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
*Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Loamy, mesic Udorthents
*Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
*Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Russell	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls

* U.S. Government Printing Office: 1991-281-364/40022

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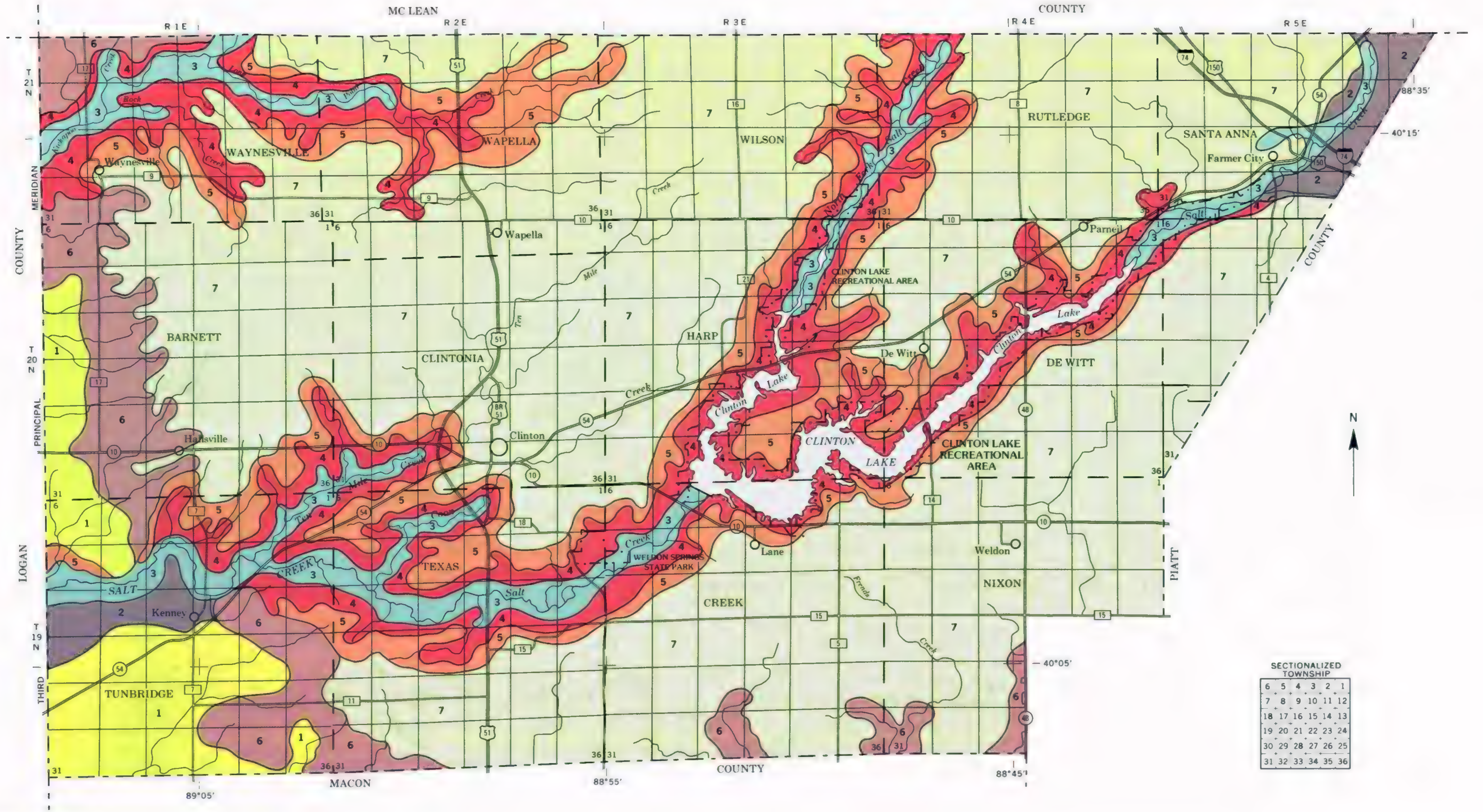


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND

1. IPAVA-SABLE-TAMA ASSOCIATION: Nearly level and gently sloping, poorly drained to moderately well drained soils formed in loess; on uplands
2. PLANO-ELBURN-SABLE ASSOCIATION: Nearly level and gently sloping, well drained, somewhat poorly drained, and poorly drained soils formed in loess and outwash or entirely in loess; on outwash plains, stream terraces, or uplands
3. SAWMILL-LAWSON ASSOCIATION: Nearly level, poorly drained and somewhat poorly drained soils formed in alluvium; on flood plains
4. MIAMI ASSOCIATION: Strongly sloping to very steep, well drained soils formed mainly in glacial till; on uplands
5. BIRKBECK-RUSSELL-KEOMAH ASSOCIATION: Nearly level to strongly sloping, well drained to somewhat poorly drained soils formed in loess and glacial till or entirely in loess; on uplands
6. CATLIN-DANA ASSOCIATION: Gently sloping and sloping, moderately well drained soils formed in loess and glacial till; on uplands
7. SABLE-IPAVA-CATLIN ASSOCIATION: Nearly level to sloping, poorly drained to moderately well drained soils formed in loess or in loess and glacial till; on uplands

Compiled 1986

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

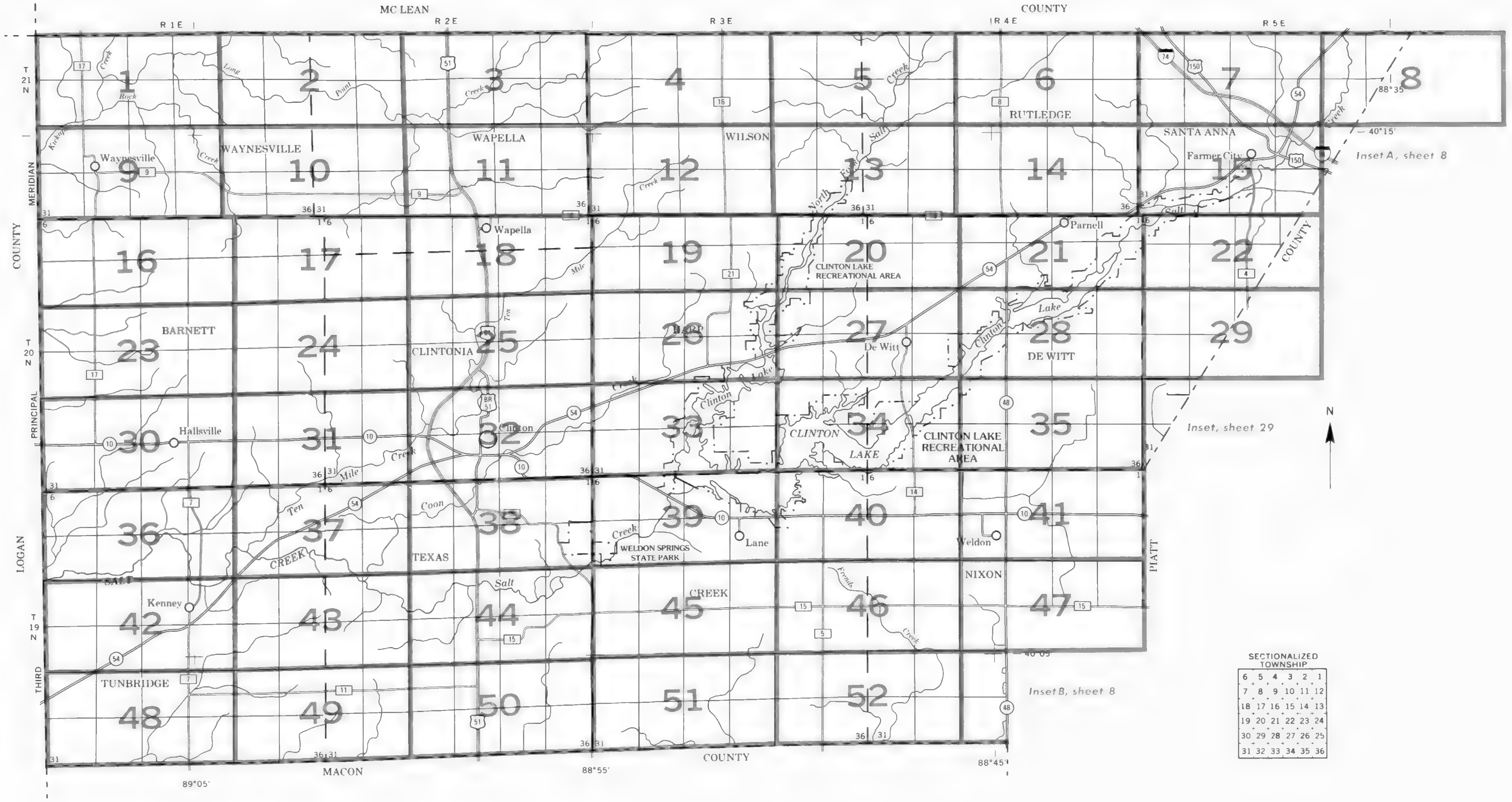
GENERAL SOIL MAP

DE WITT COUNTY, ILLINOIS

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

DE WITT COUNTY, ILLINOIS

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is moderately eroded and 3 that it is severely eroded.

SYMBOL	NAME
17	Keomah silt loam
27D2	Miami loam, 10 to 15 percent slopes, eroded
27E	Miami loam, 15 to 30 percent slopes
27G	Miami silt loam, 30 to 50 percent slopes
36B	Tama silt loam, 1 to 5 percent slopes
43	Ipava silt loam
45	Denny silt loam
56B2	Dana silt loam, 2 to 6 percent slopes, eroded
67	Harpster silty clay loam
68	Sable silty clay loam
73	Ross loam
107	Sawmill silty clay loam
134C2	Camden silt loam, 5 to 10 percent slopes, eroded
138	Shiloh silty clay loam
148B2	Proctor silt loam, 2 to 6 percent slopes, eroded
171B2	Catlin silty clay loam, 2 to 5 percent slopes, eroded
171C2	Catlin silty clay loam, 5 to 10 percent slopes, eroded
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B2	Plano silt loam, 2 to 5 percent slopes, eroded
206	Thorp silt loam
221C2	Parr silt loam, 5 to 10 percent slopes, eroded
233B	Birkbeck silt loam, 1 to 4 percent slopes
233C2	Birkbeck silt loam, 4 to 8 percent slopes, eroded
243B	St. Charles silt loam, 1 to 5 percent slopes
244	Hartsburg silty clay loam
279B	Rozetta silt loam, 1 to 5 percent slopes
322C2	Russell silt loam, 5 to 10 percent slopes, eroded
322D3	Russell silty clay loam, 10 to 15 percent slopes, severely eroded
330	Peotone silty clay loam
415	Orion silt loam
451	Lawson silt loam
533	Urban land
683	Lawndale silt loam
684B	Broadwell silt loam, 2 to 5 percent slopes
802B	Orthents, loamy, gently sloping
802D	Orthents, loamy, strongly sloping
865	Pits, gravel

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County or parish
- Reservation (state forest or park)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, cemetery — Davis Airstrip

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections)

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 74
- Federal — 150
- State — 54

DAMS

- Large (to scale)
- Medium or small — water

PITS

- Gravel pit

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Drainage ditch

LAKES, PONDS AND RESERVOIRS

- Perennial — water

MISCELLANEOUS WATER FEATURES

- Marsh or swamp

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 43 36B

ESCARPMENTS

- Other than bedrock (points down slope)

SHORT STEEP SLOPE

DEPRESSION OR SINK

SOIL SAMPLE SITE — S

MISCELLANEOUS

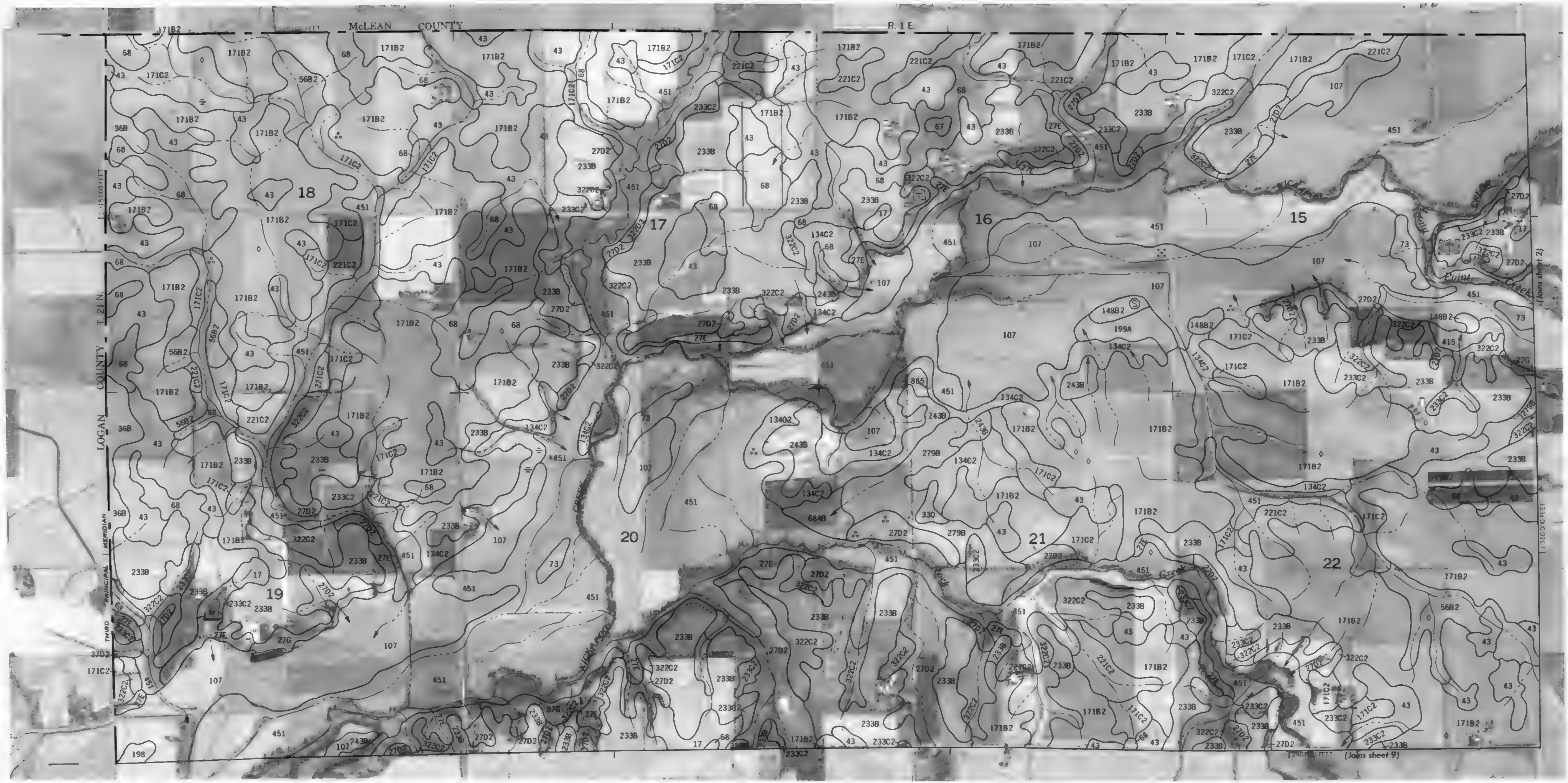
- Gravelly spot
- Sandy spot
- Severely eroded spot
- Calcareous spot
- Coarse-loamy soil spot — #

1

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 1



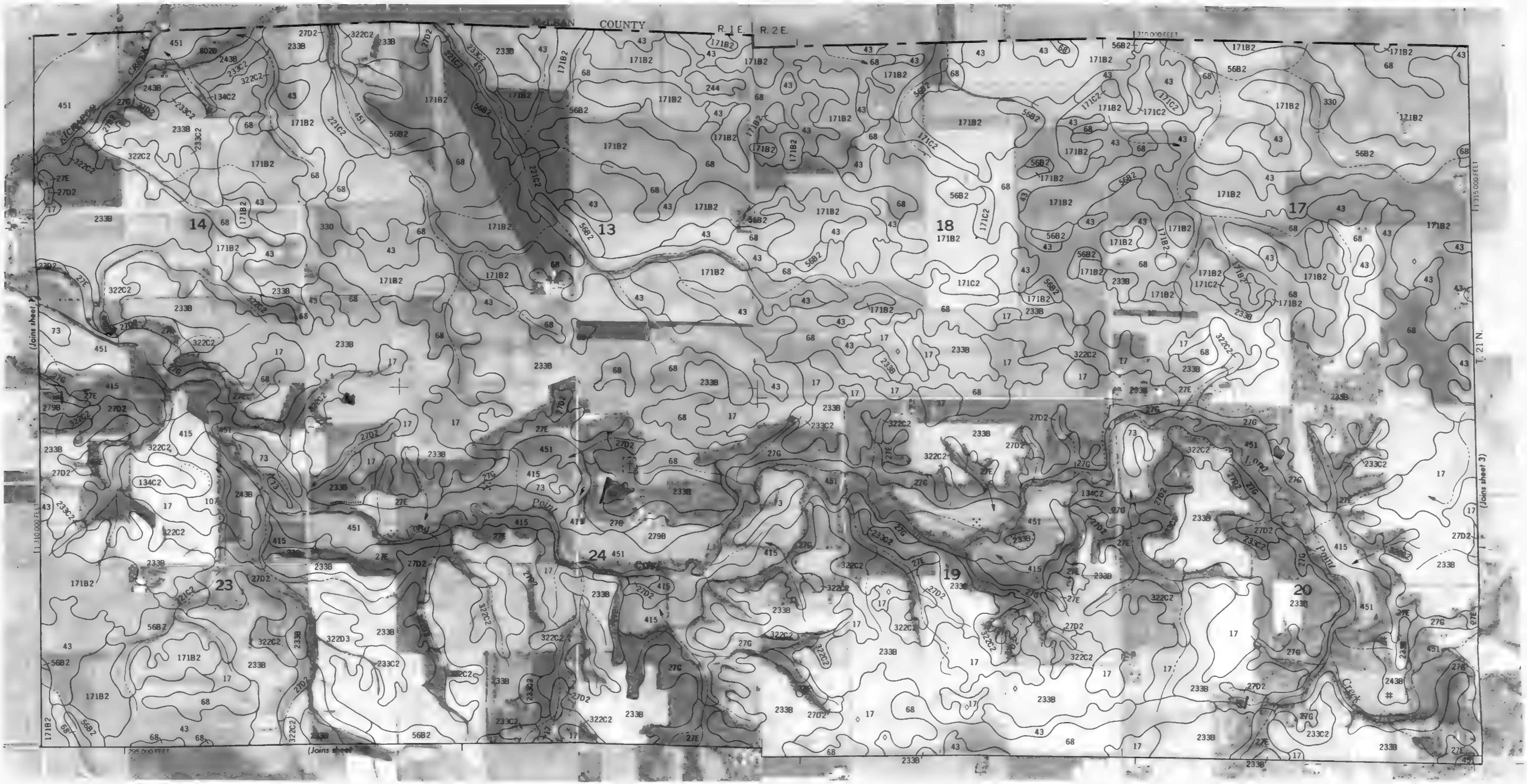
Scale 1:15 840

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

2

N



1 ¾ ½ ¼ 0 1 Mile

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Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 2

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3

N

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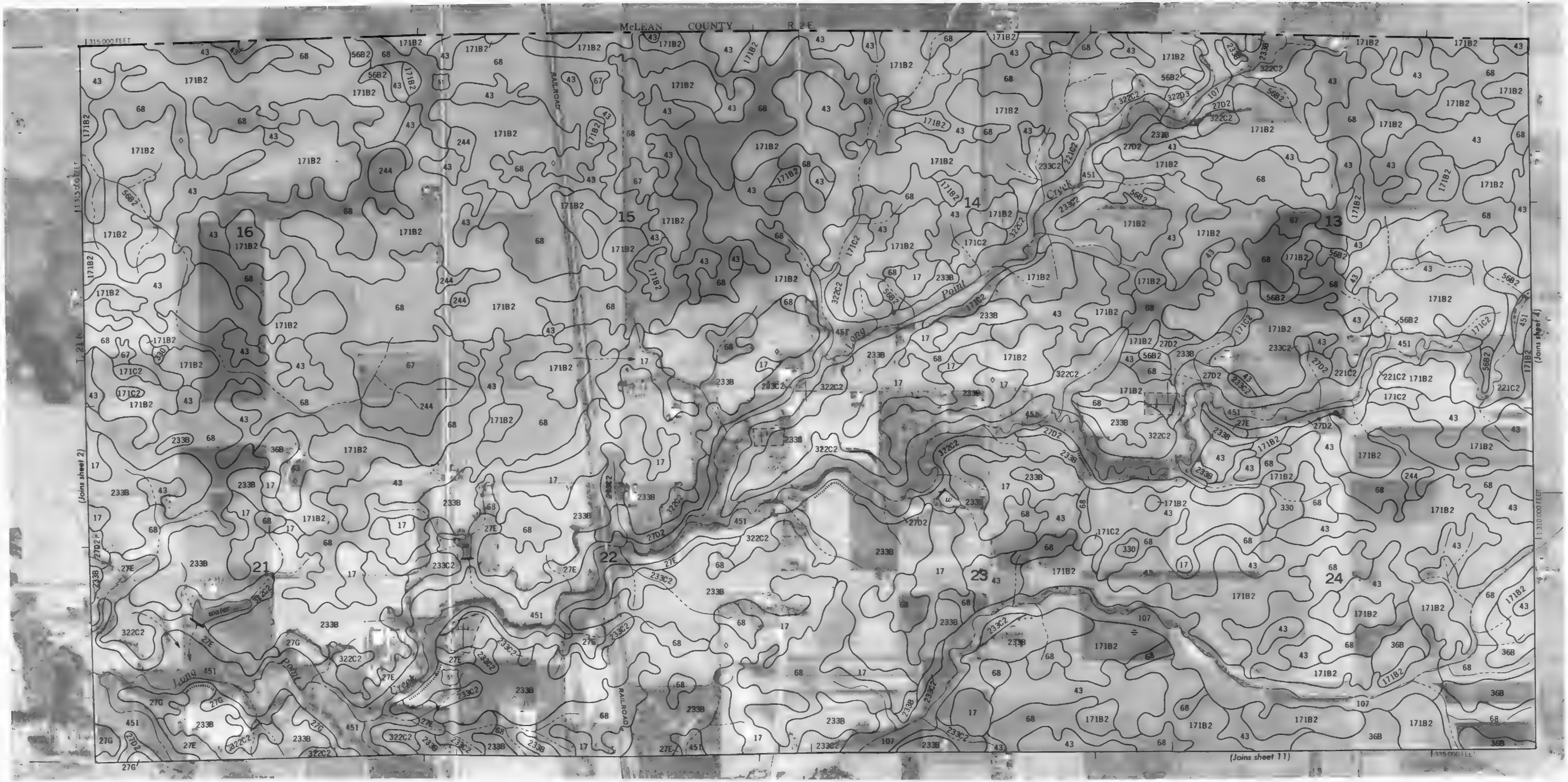
DEWITT COUNTY, ILLINOIS NO. 3



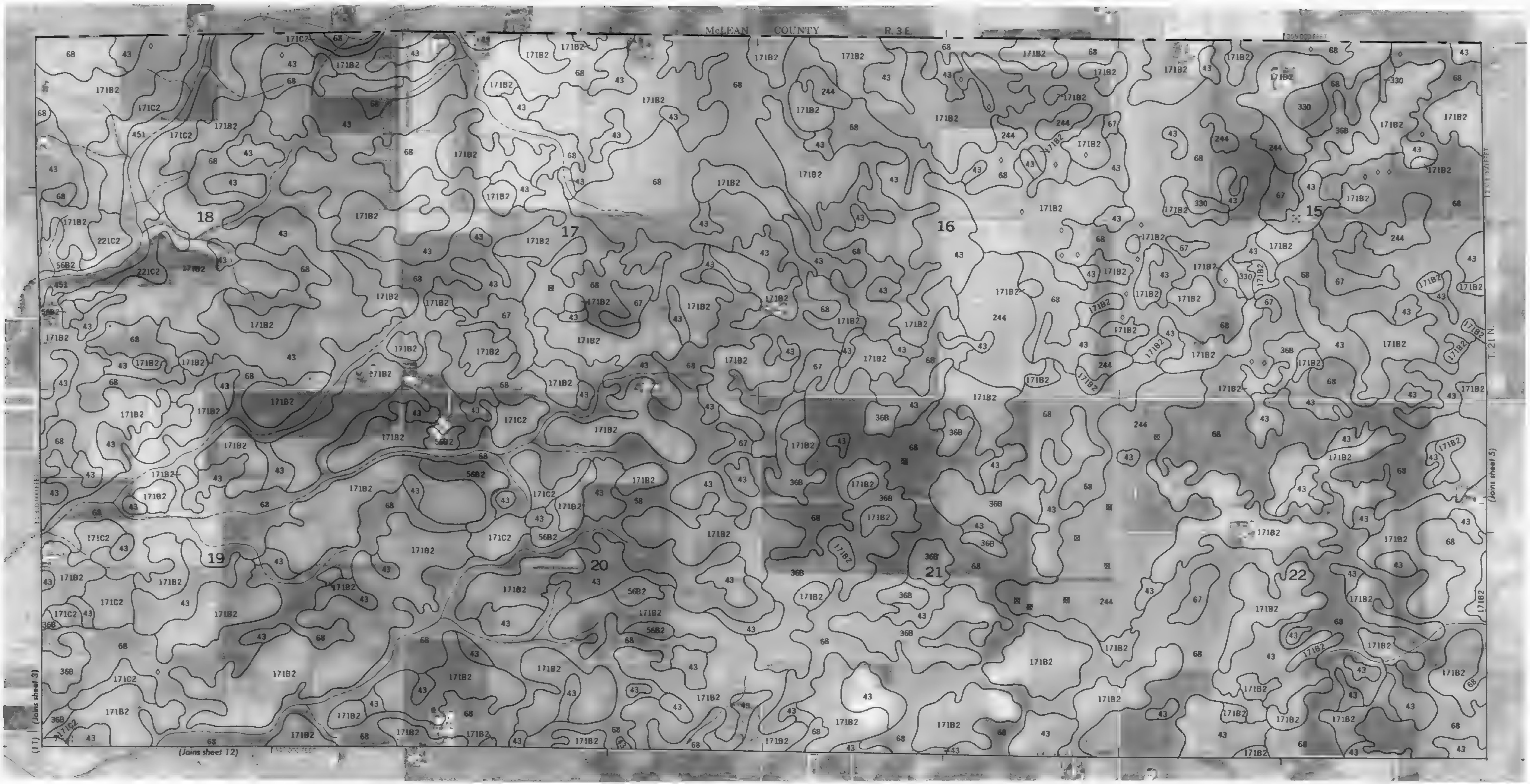
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 4

N



1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 4

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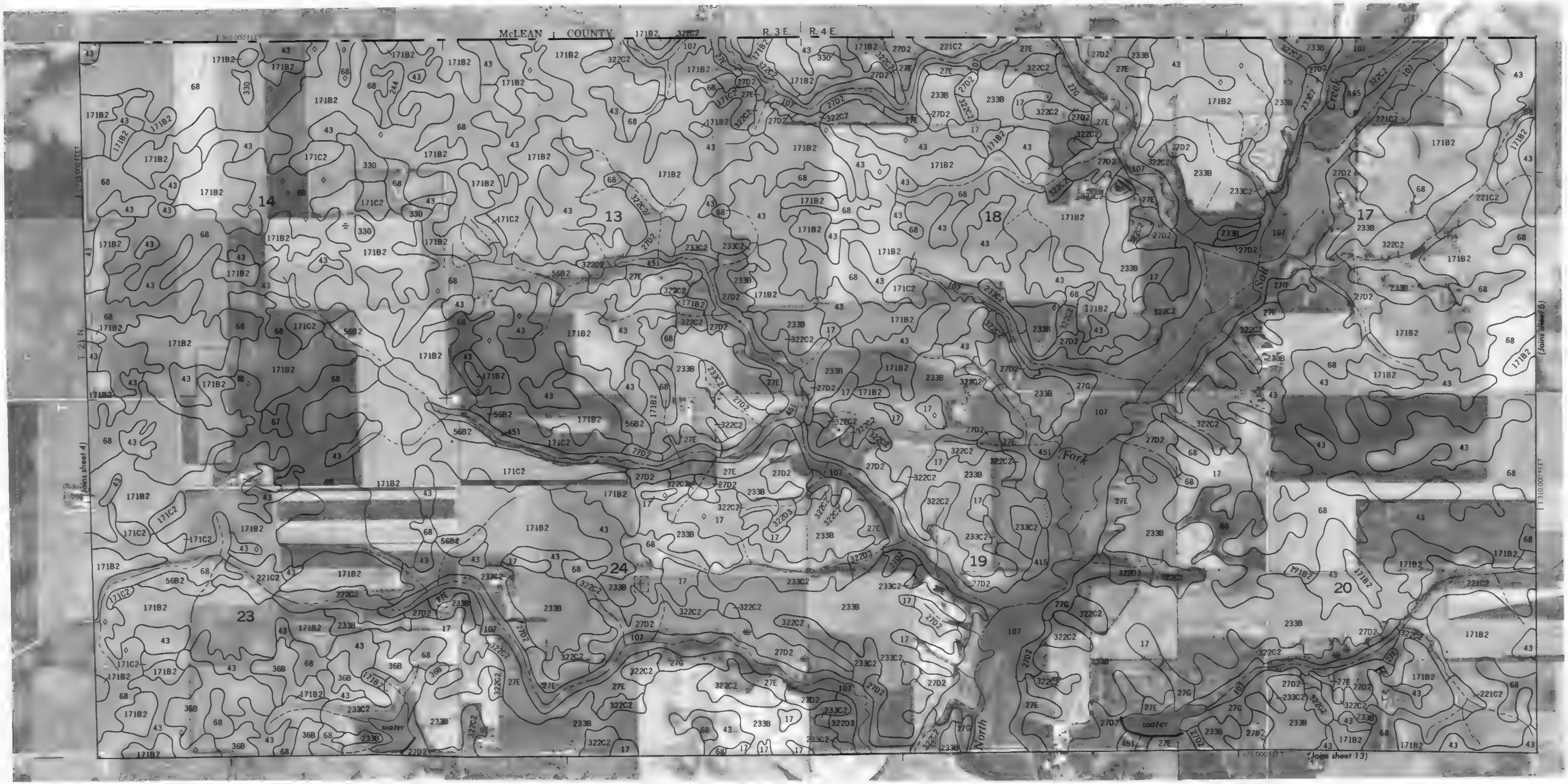
5

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

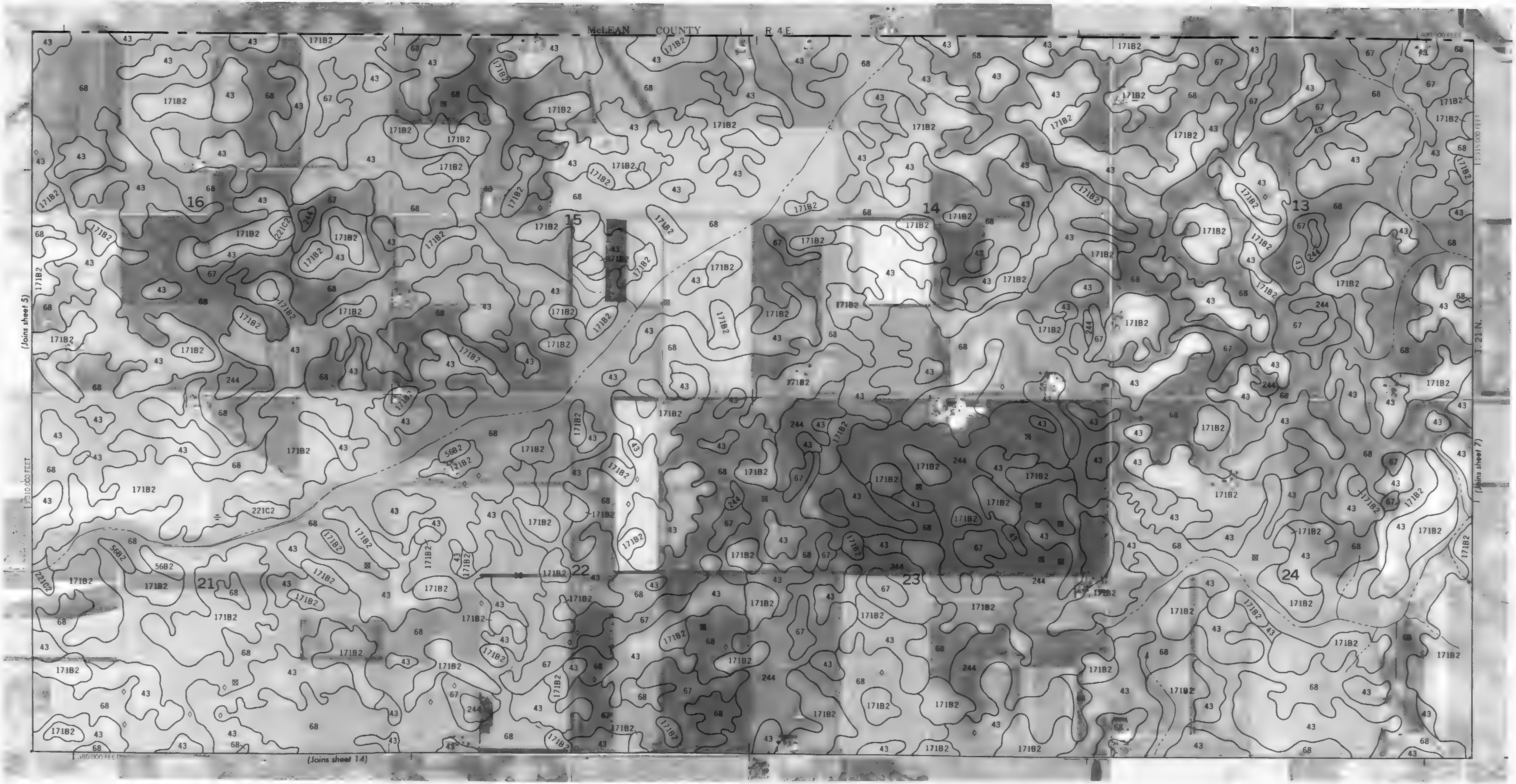
Scale 1:15 840

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 5

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 6

N



1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 6

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7

N

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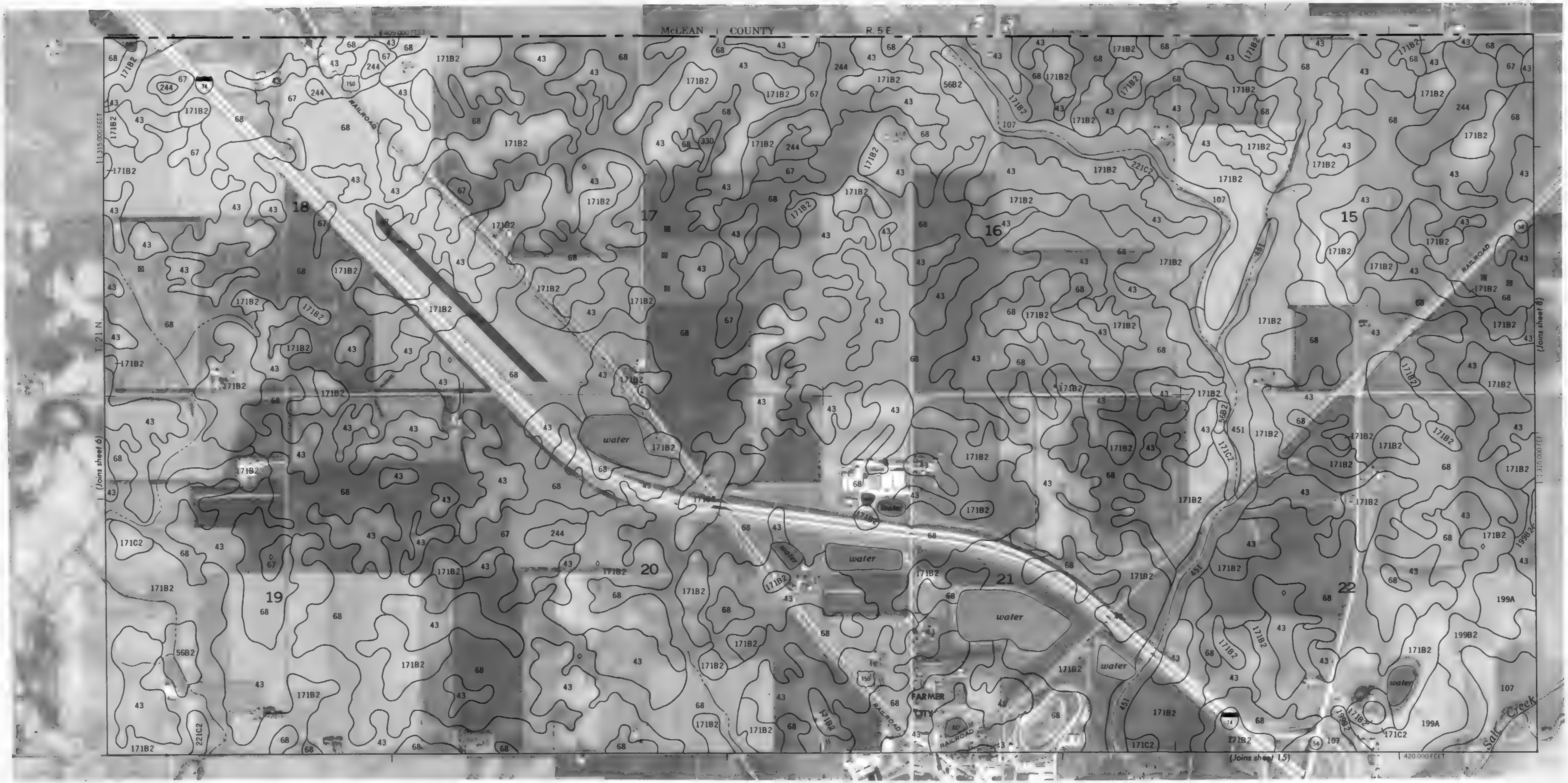
DEWITT COUNTY, ILLINOIS NO. 7



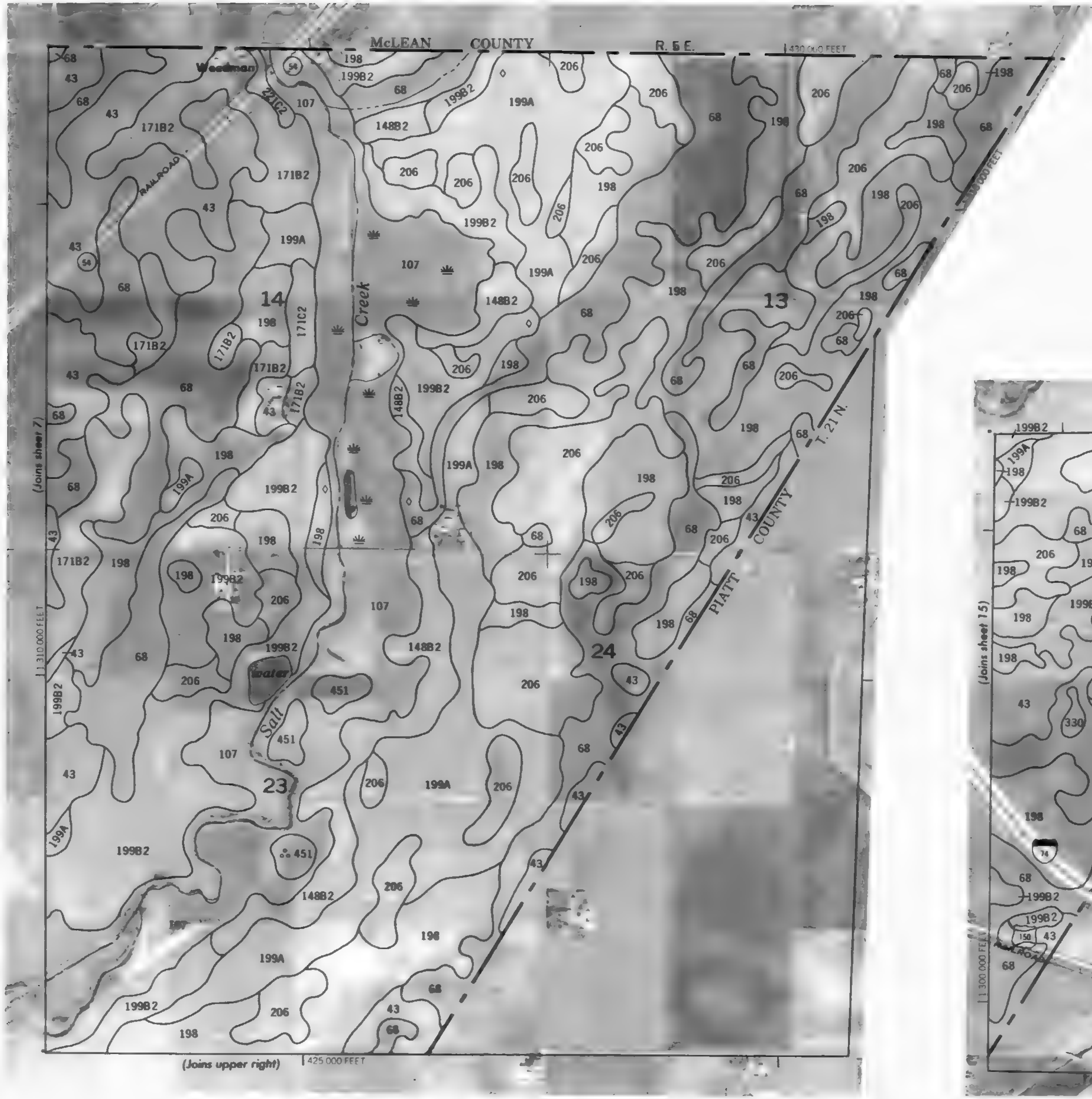
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

8

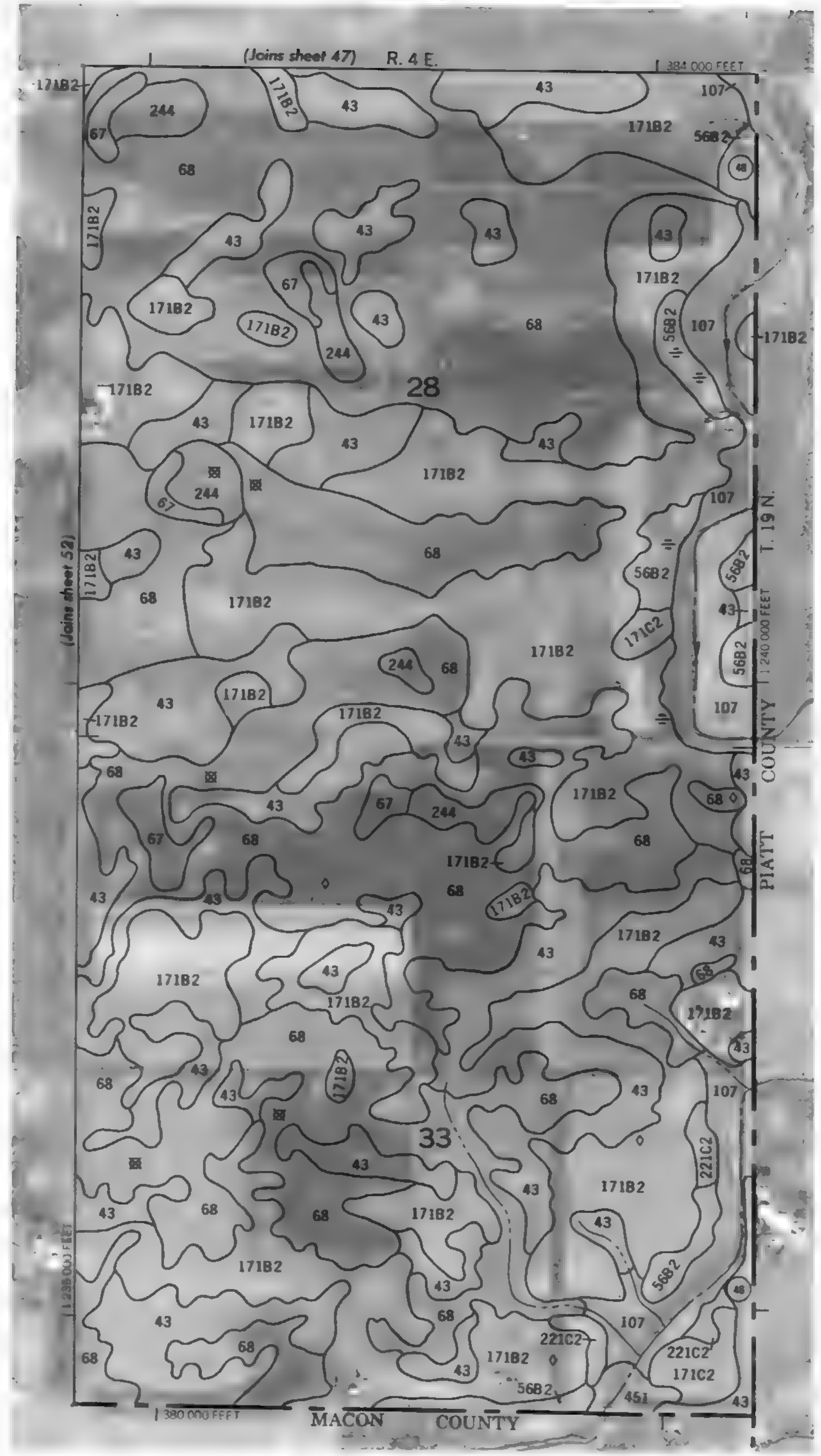
N



INSET A

3000 AND 5000-FOOT GRID TICKS

INSET B



4000 AND 5000-FOOT GRID TICKS

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 8

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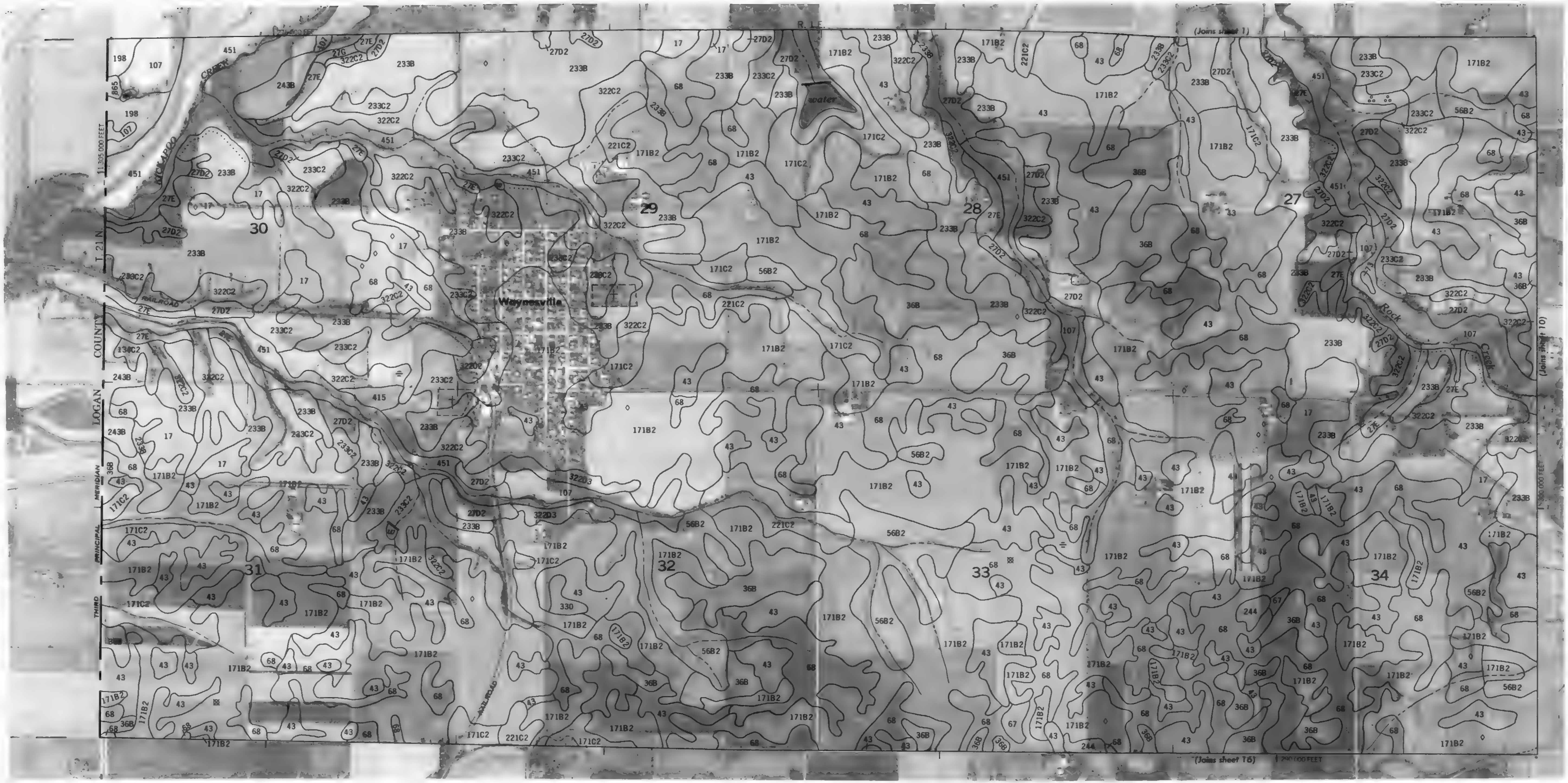
9

N



1 ¾ ½ ¼ 0 1 Mile

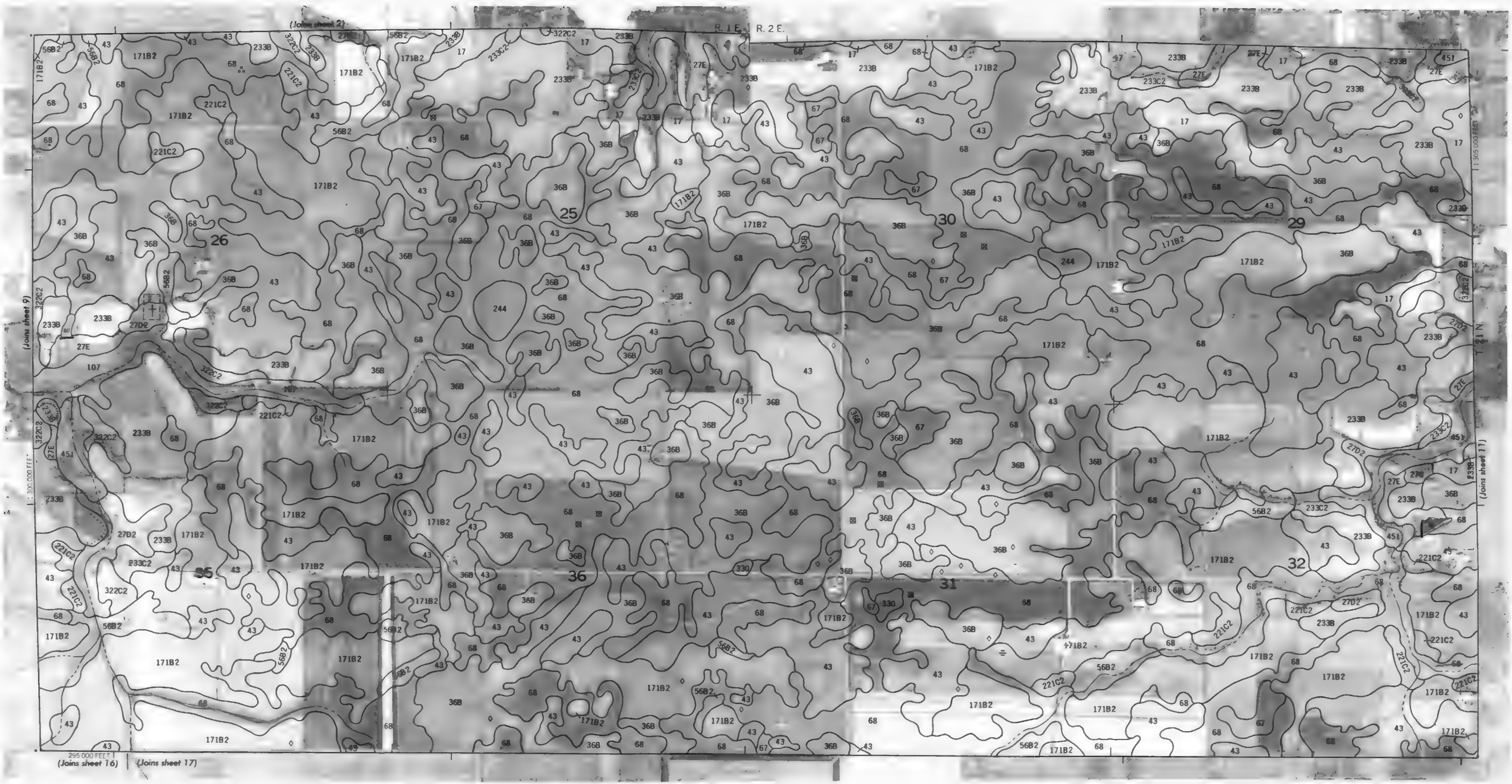
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. DEWITT COUNTY, ILLINOIS NO. 9

10

N



1 — ¾ — ½ — ¼ — 0 — 1 Mile

5 000 — 4 000 — 3 000 — 2 000 — 1 000 — 0 — 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 10

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11

N

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DEWITT COUNTY, ILLINOIS NO. 11

Scale 1:15 840

1 Mile

5 000 Feet

N

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 12

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 12

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N

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DEWITT COUNTY, ILLINOIS NO. 13

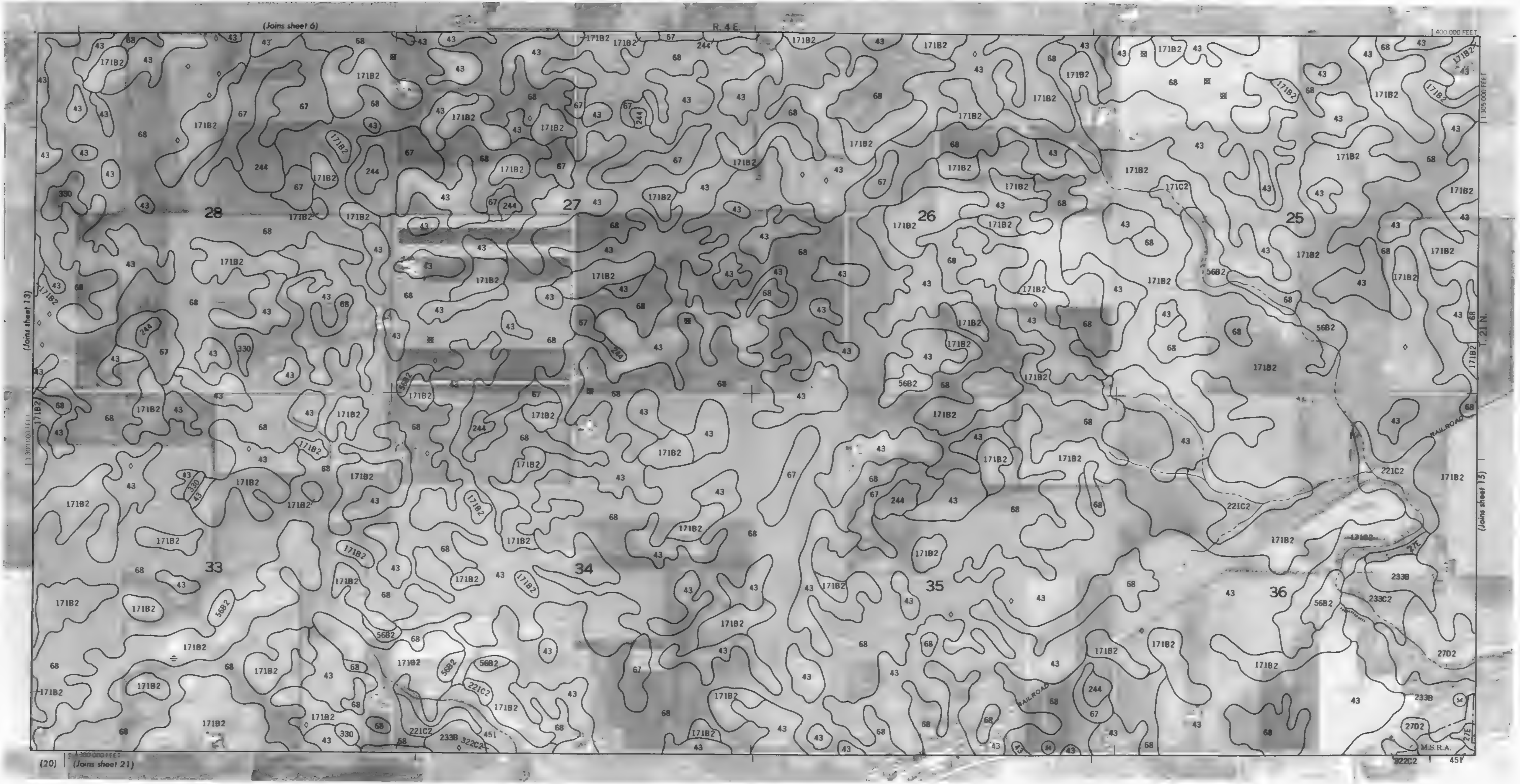
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 14



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 14

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

15

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 15

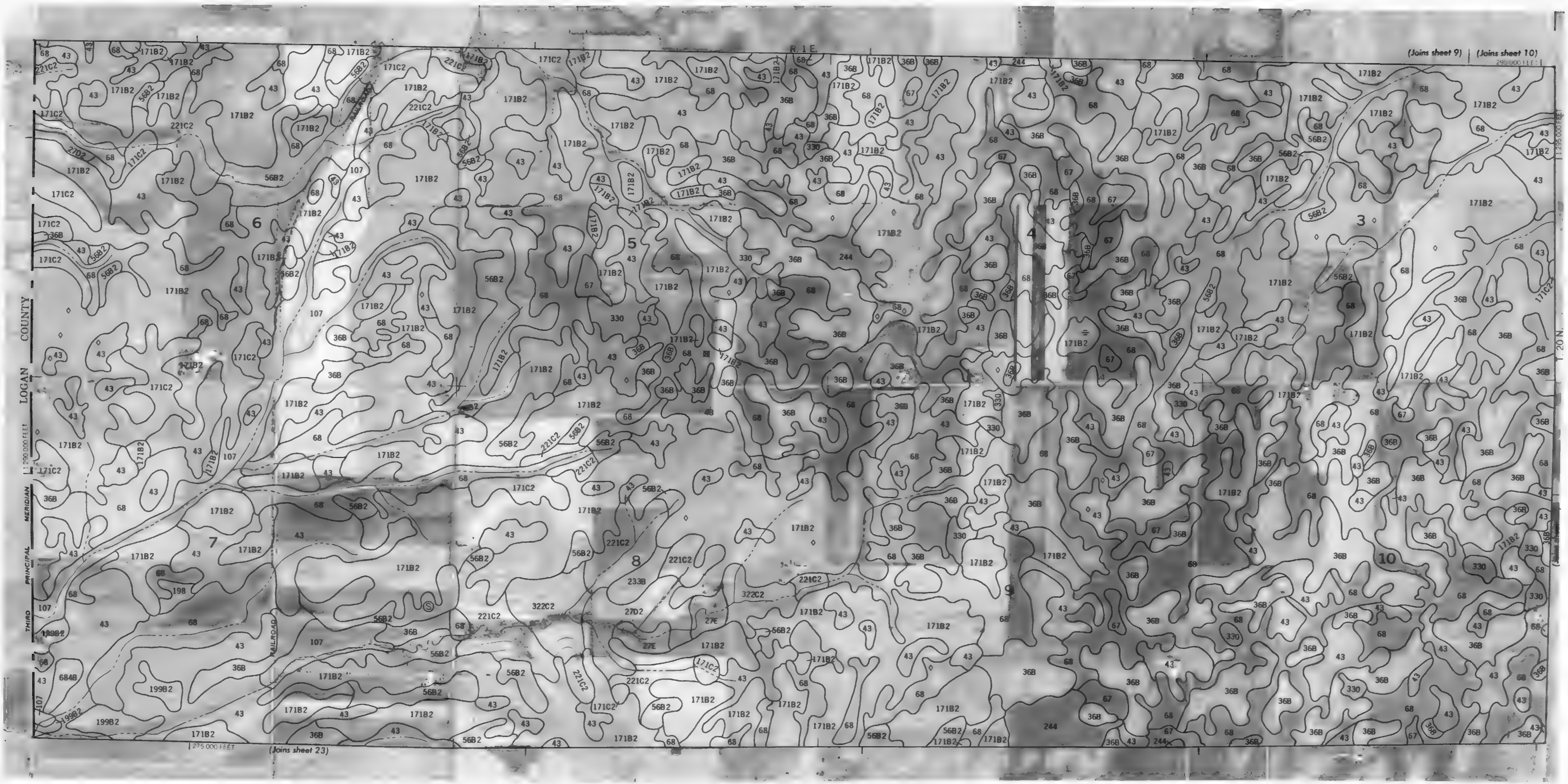
1 Mile · ¾ · ½ · ¼ · 0 · 1 Mile

5 000 · 4 000 · 3 000 · 2 000 · 1 000 · 0 · 5 000 Feet

Scale 1:15 840

16

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 16

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

17

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 17

1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 18

N

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 18

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

19

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 19

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 20

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 20

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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DEWITT COUNTY, ILLINOIS NO. 21

1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

N

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 22

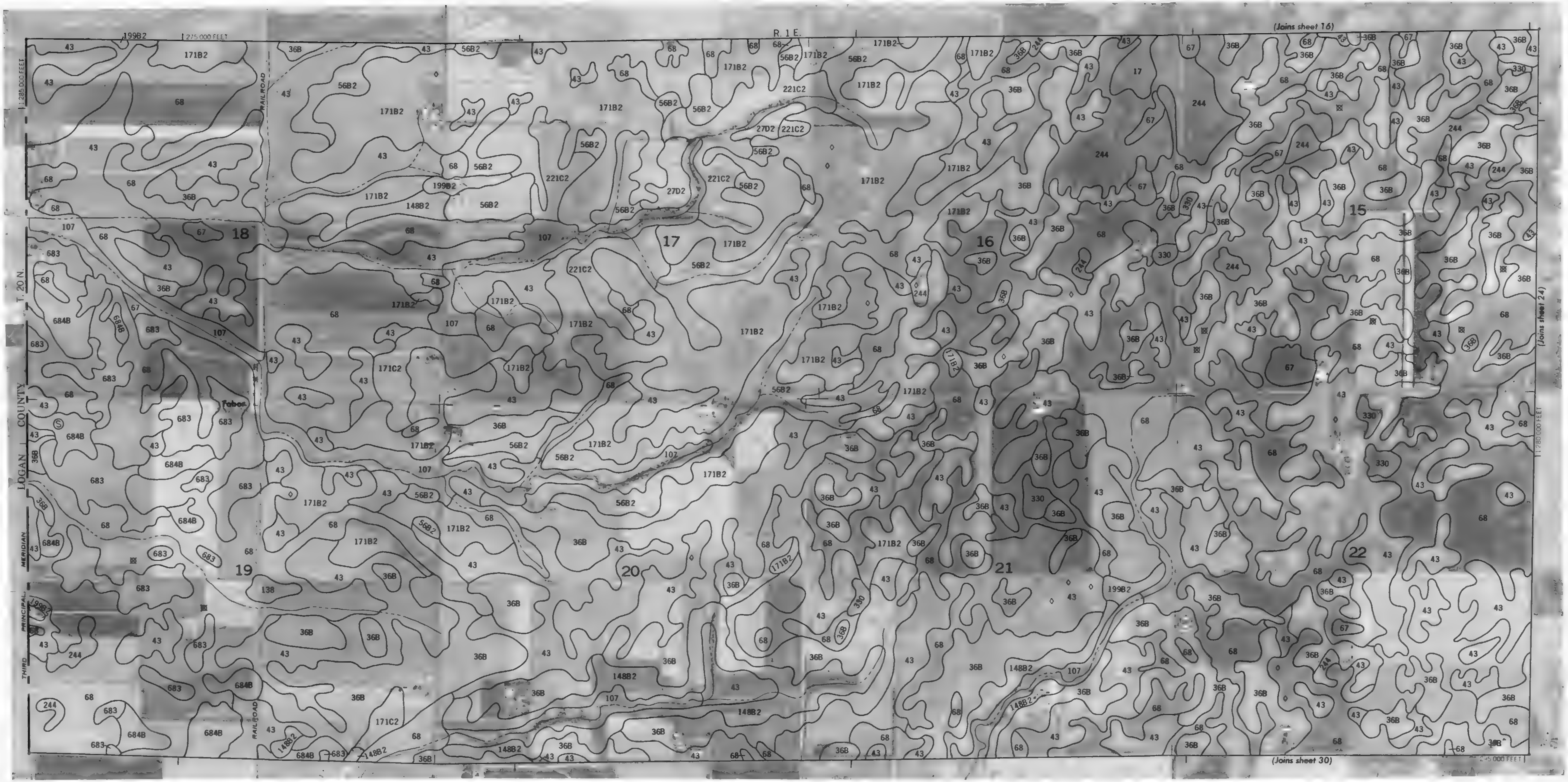
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

23

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 23

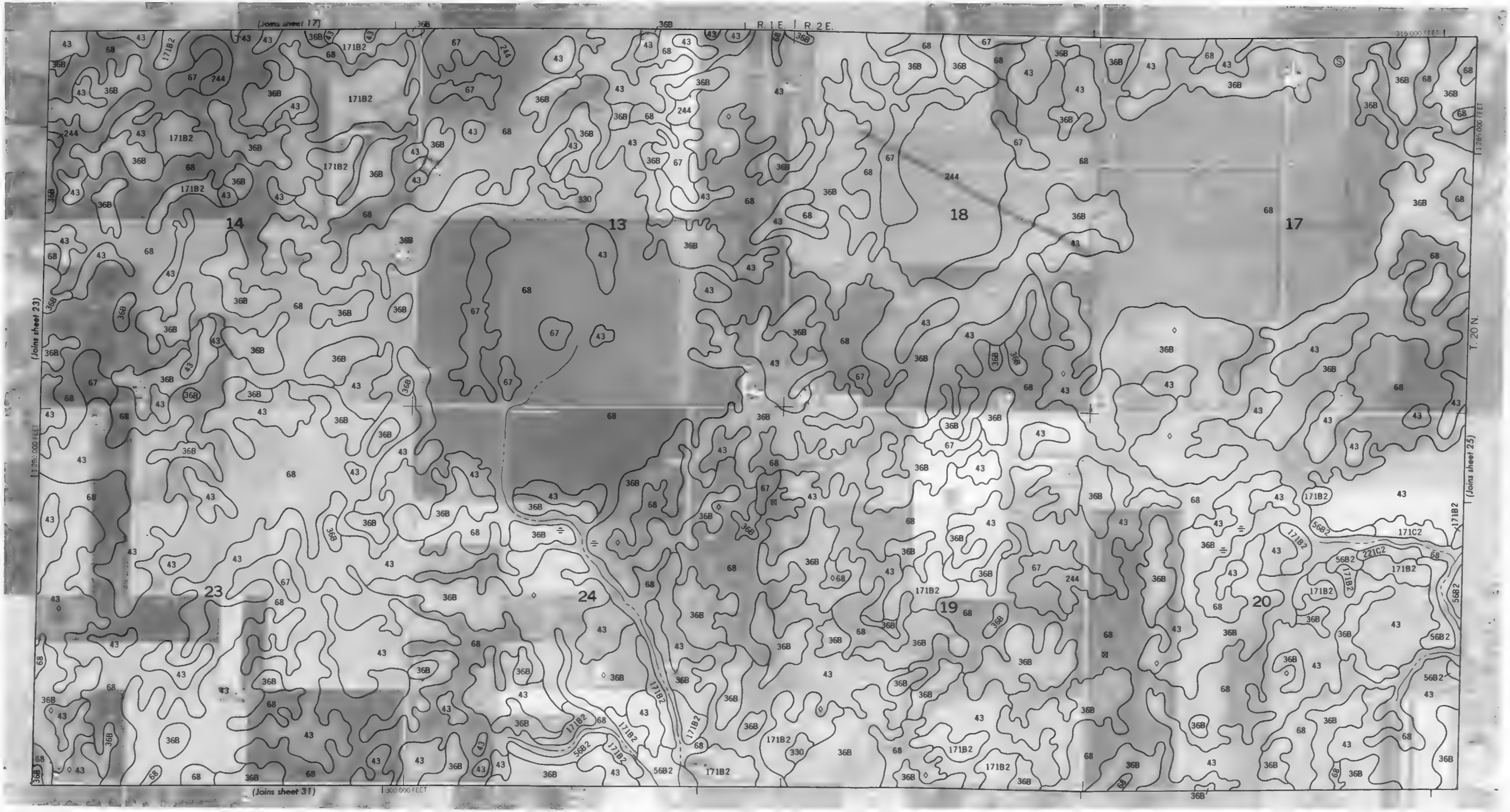


1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N



1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 24

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 25

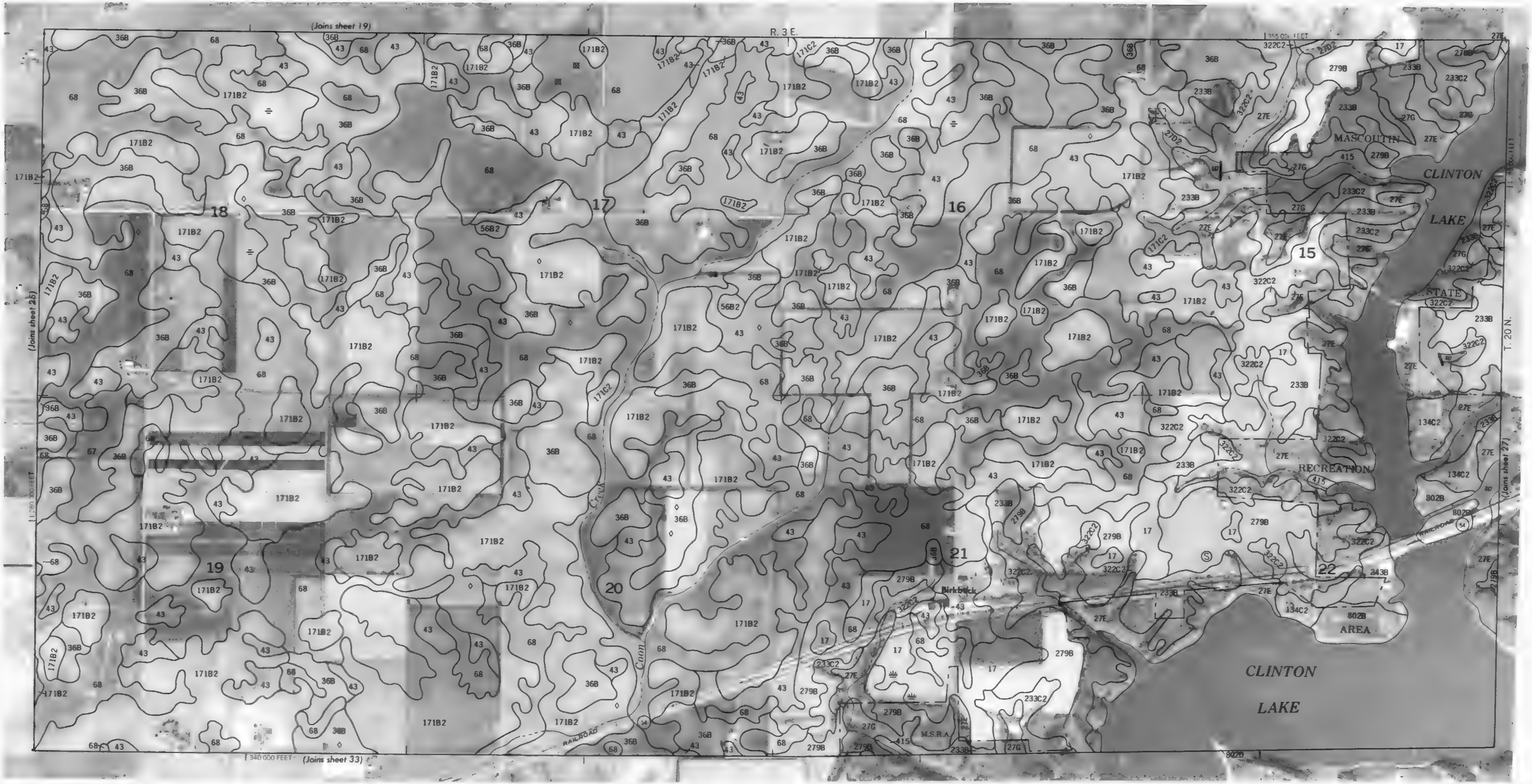
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 26

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

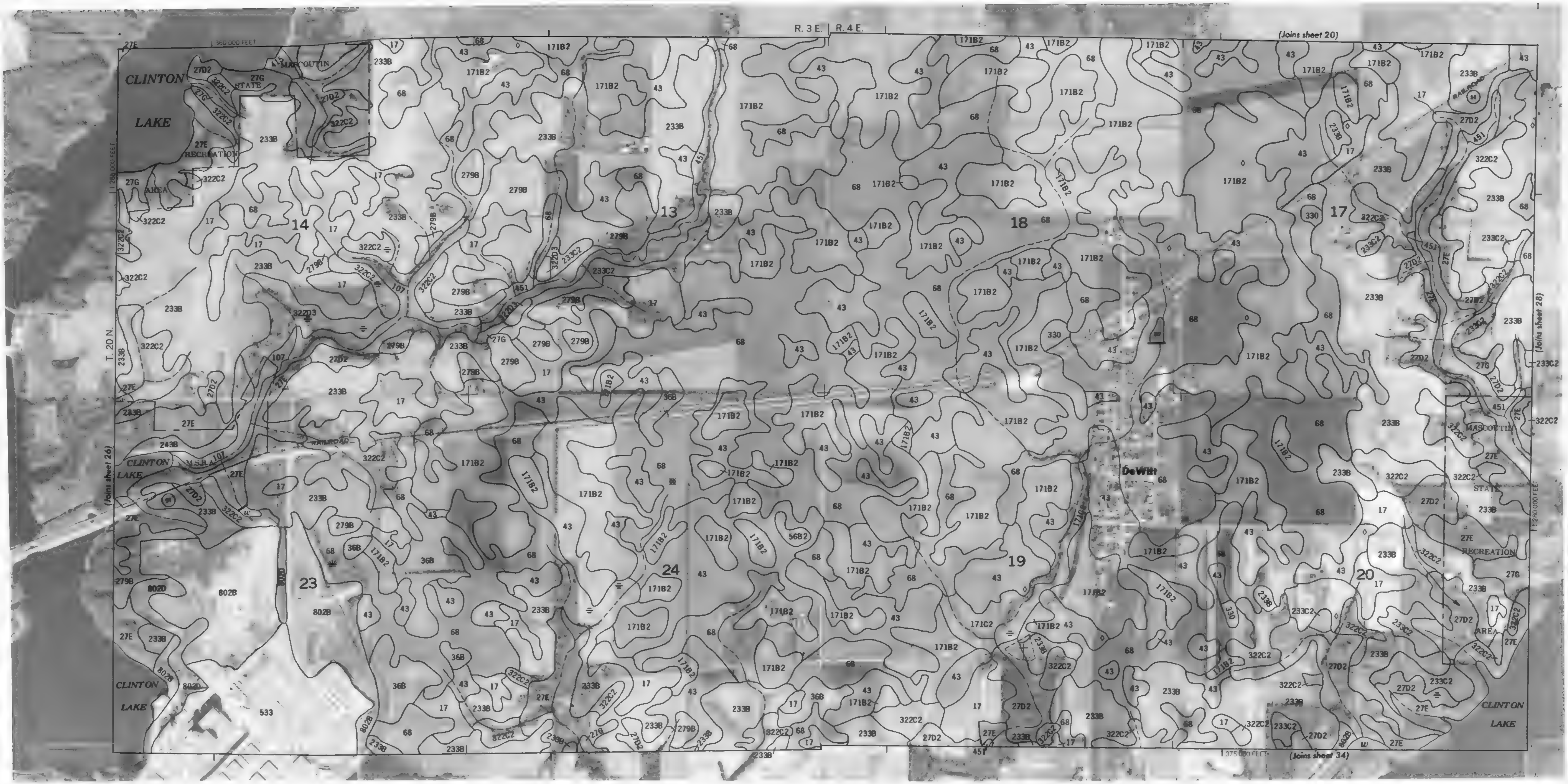
DEWITT COUNTY, ILLINOIS NO. 26

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 27



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 28

N

DEWITT COUNTY, ILLINOIS NO. 28

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

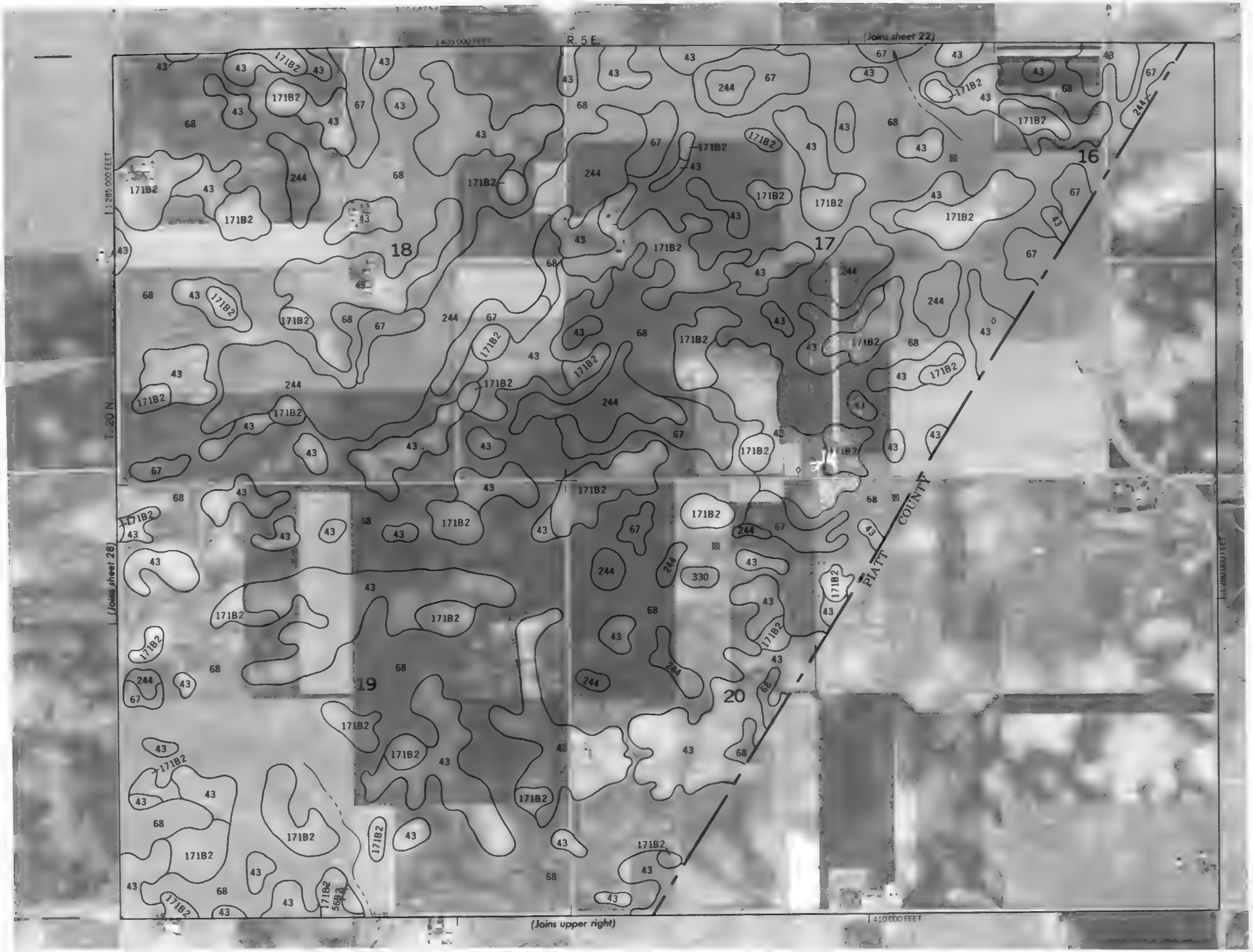
Scale 1:15 840

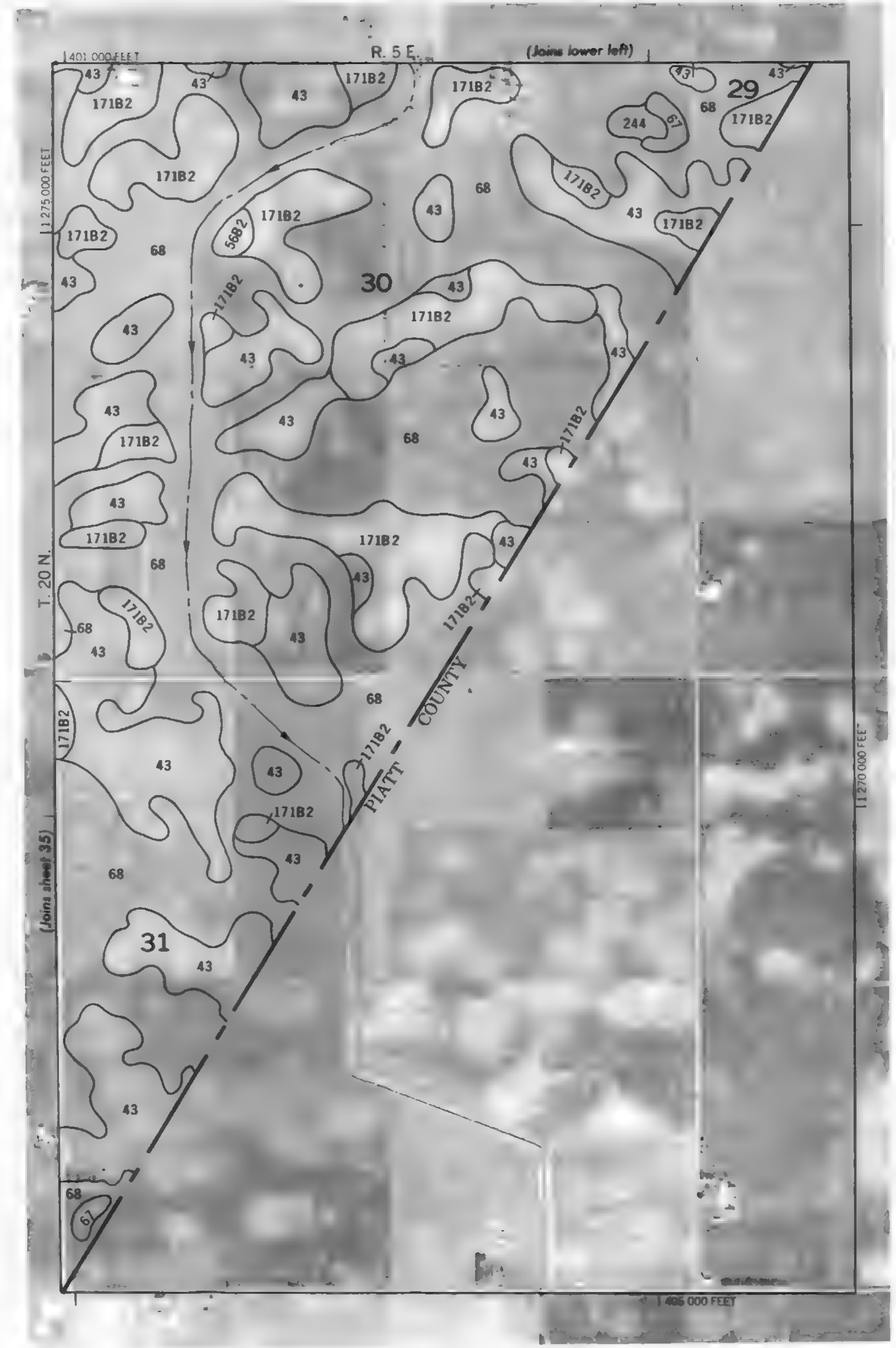
29

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 29





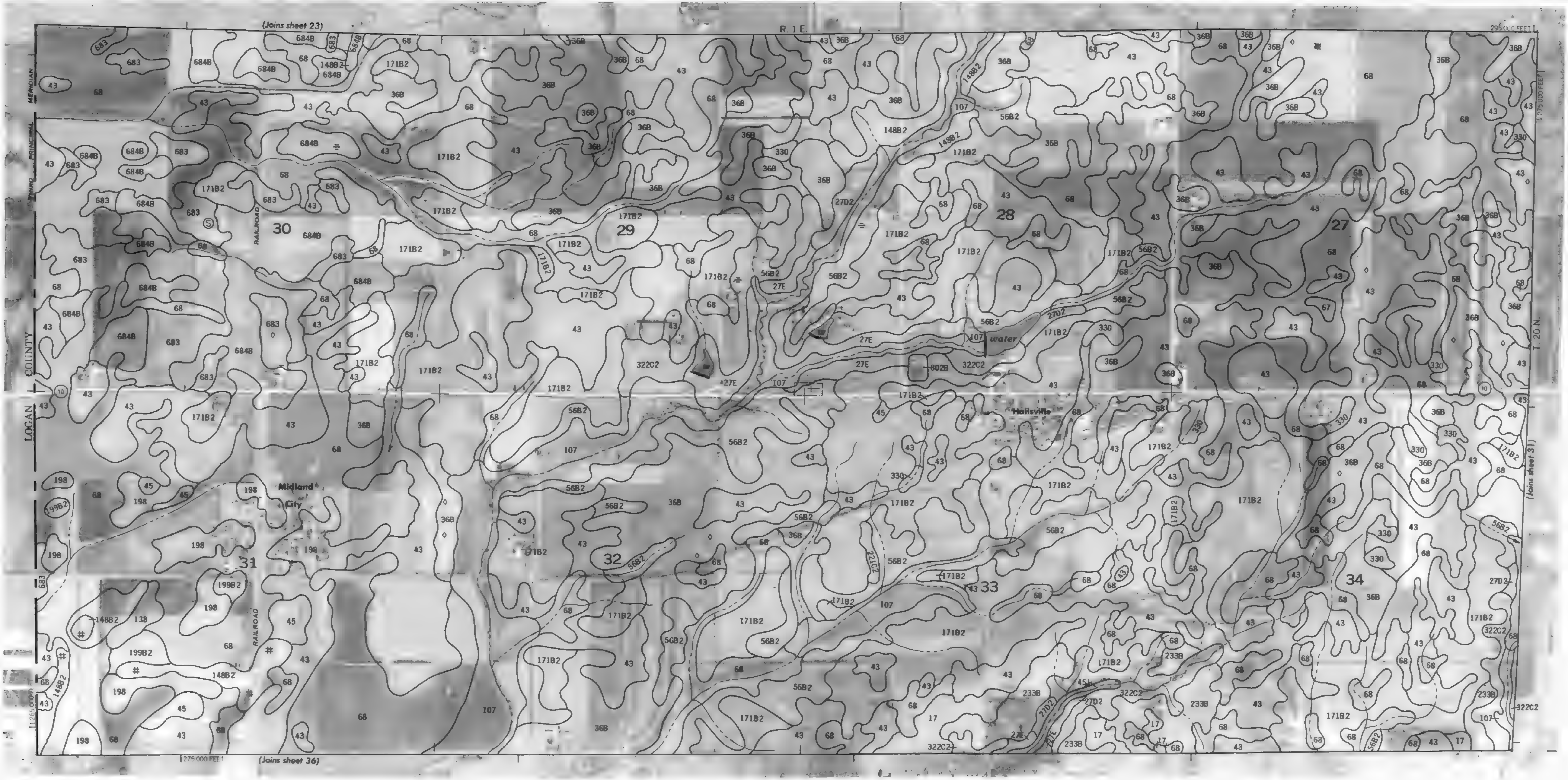
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 30

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 30

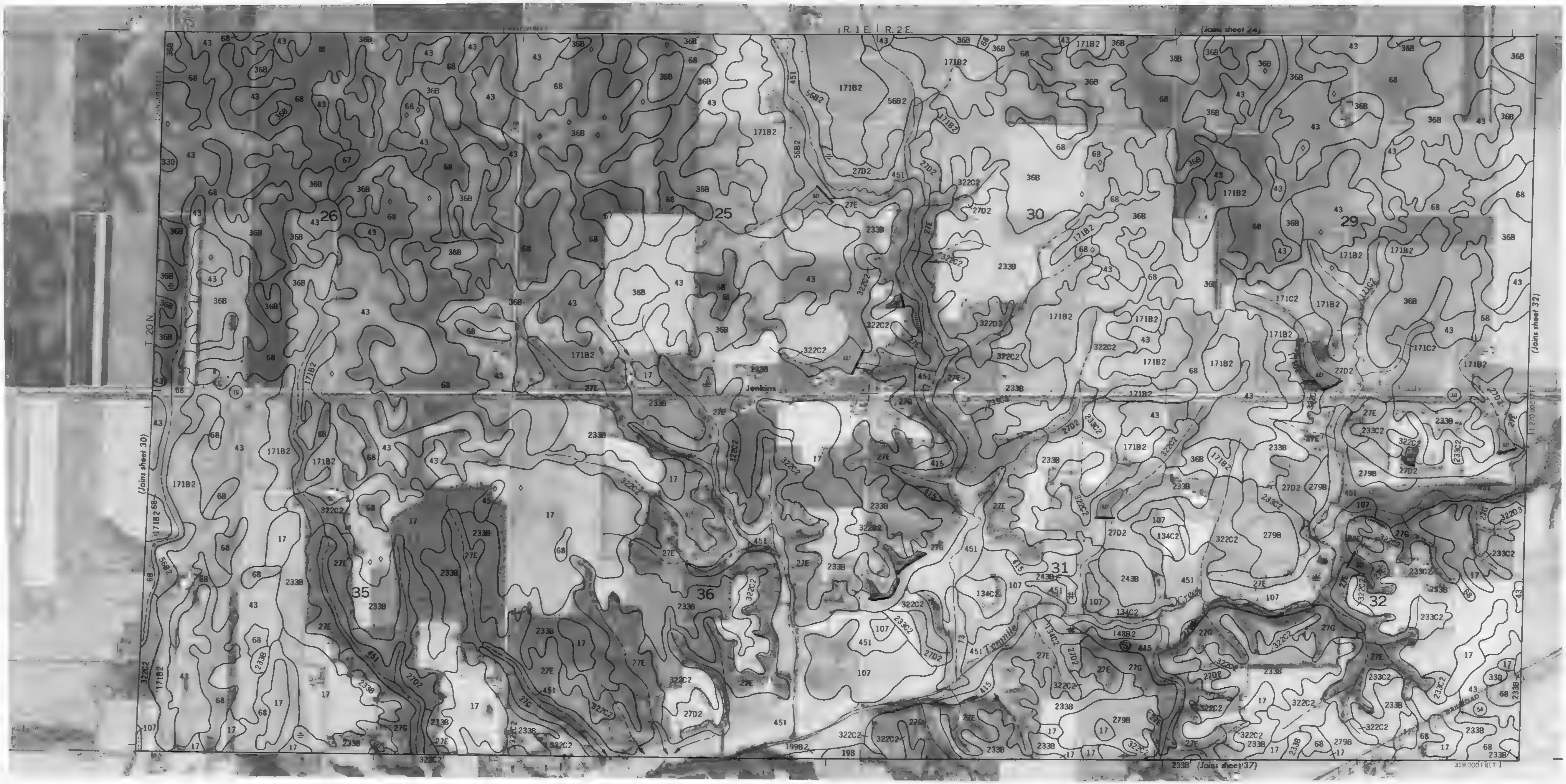
This soil survey map was compiled by the U S Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown are approximately positioned

31

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 31



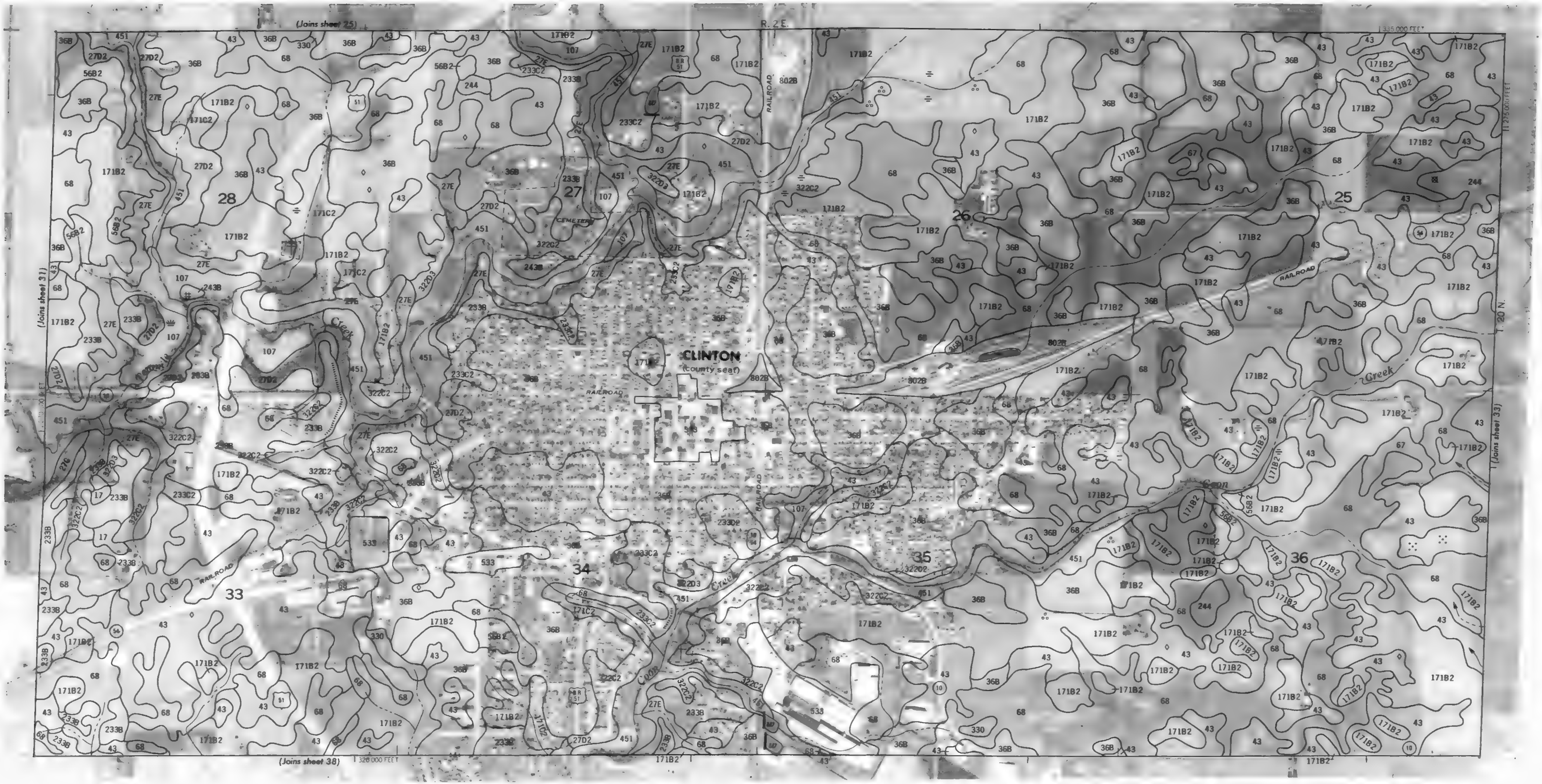
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

32

N



1 ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 32

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

33

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 33

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

34

N

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 34

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

35

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned

DEWITT COUNTY, ILLINOIS NO. 35

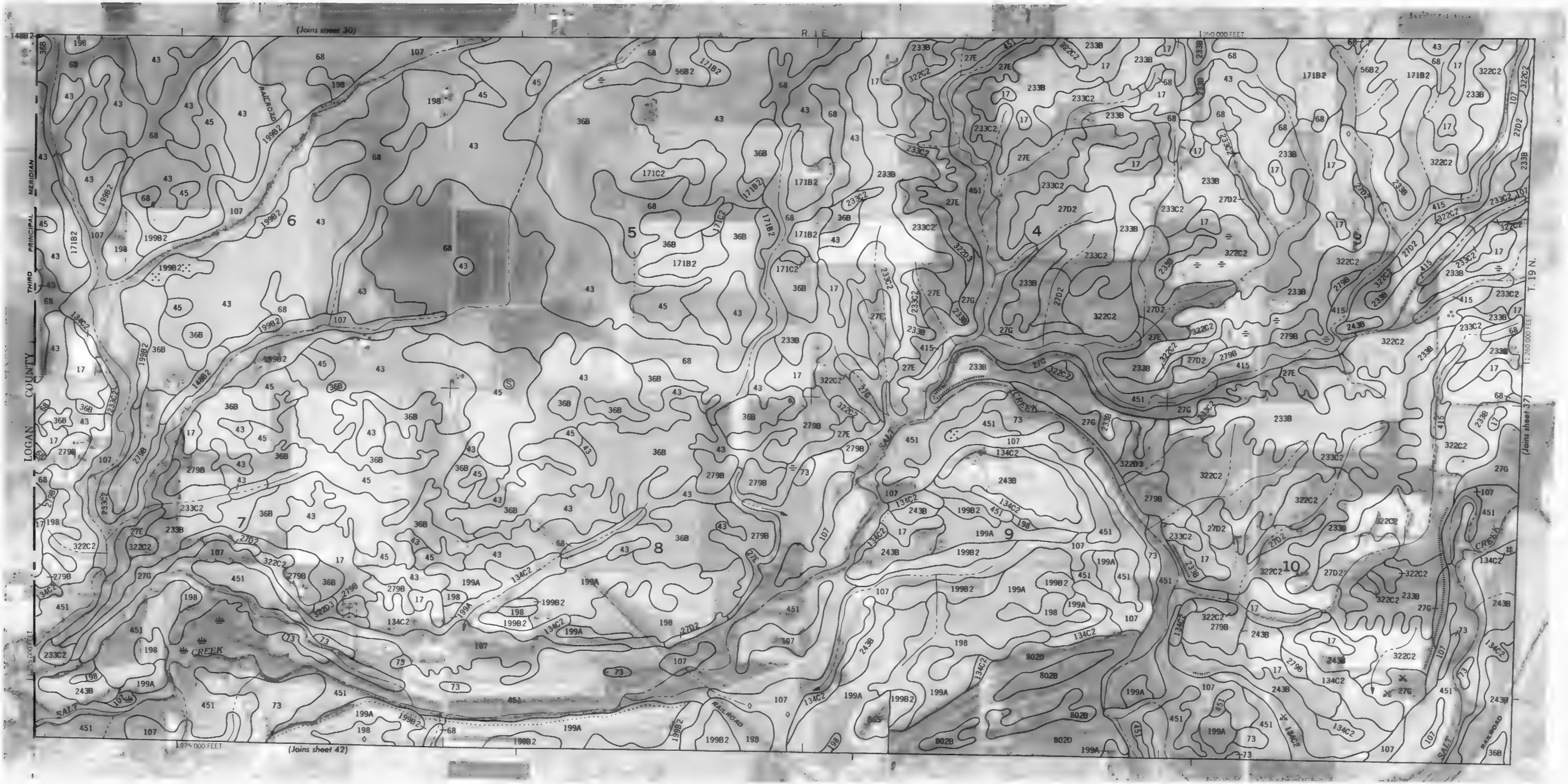
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 36

N



1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

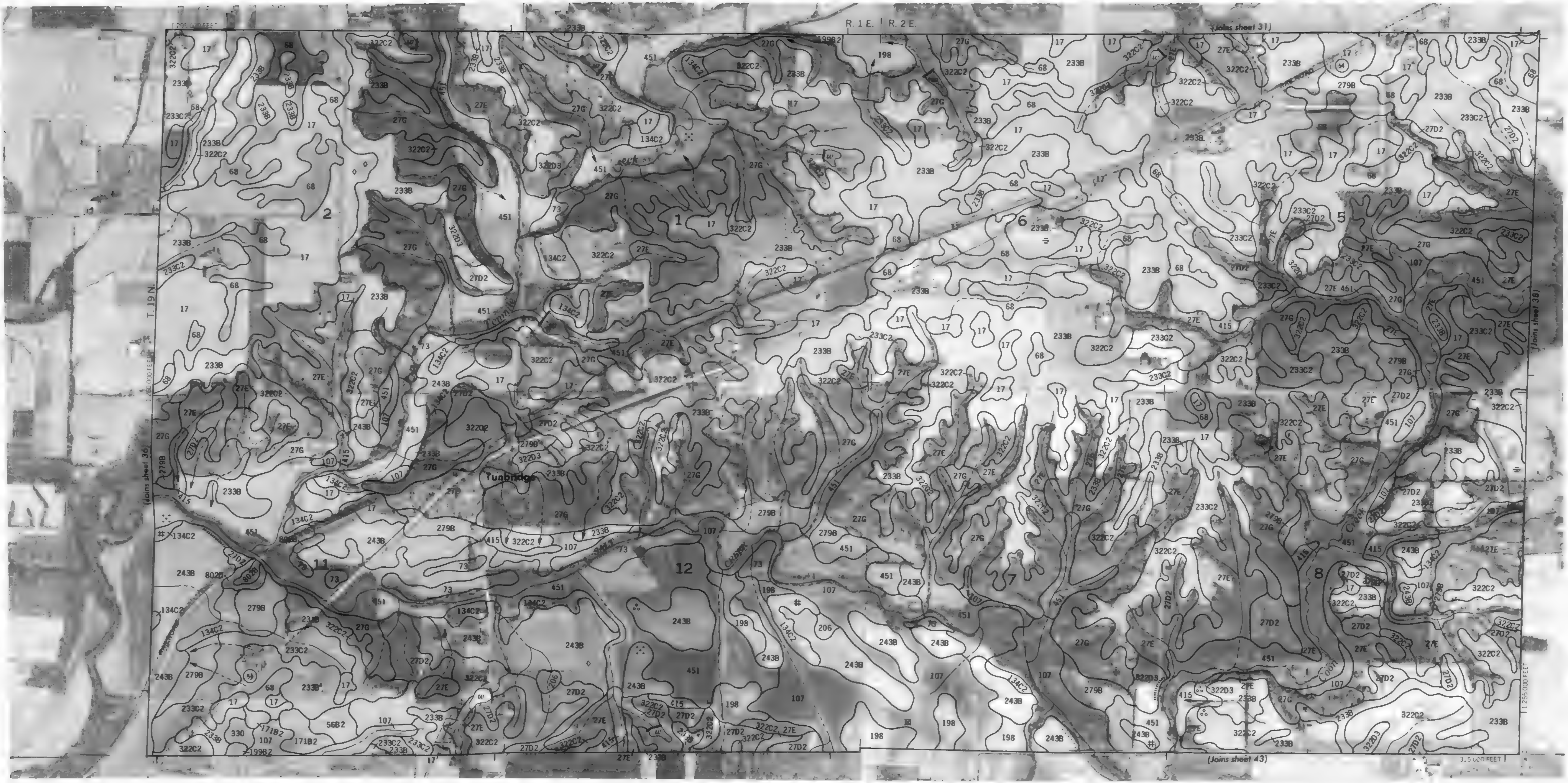
DEWITT COUNTY, ILLINOIS NO. 36

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 37



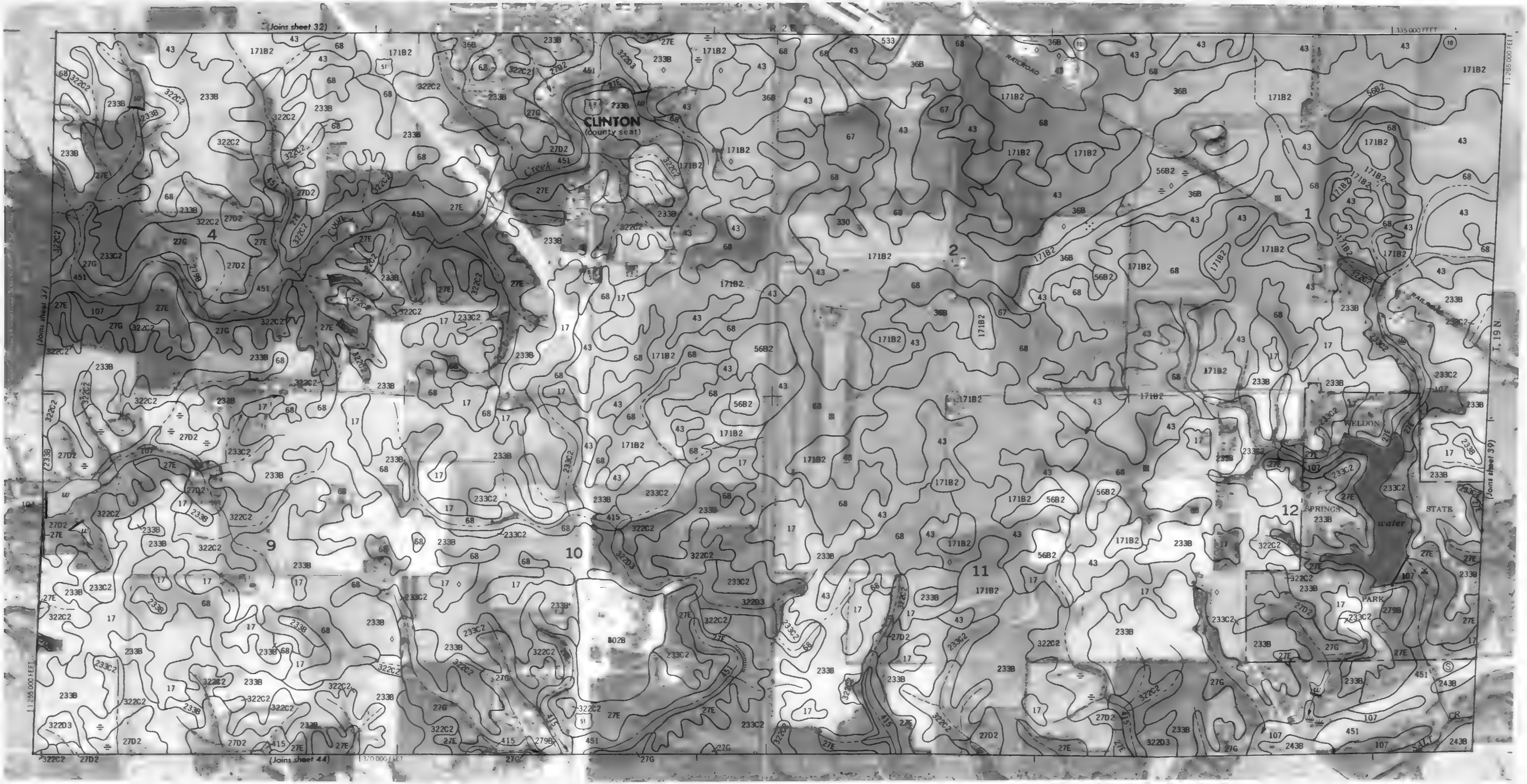
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

38

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 38

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

39

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 39

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

40

N

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 40

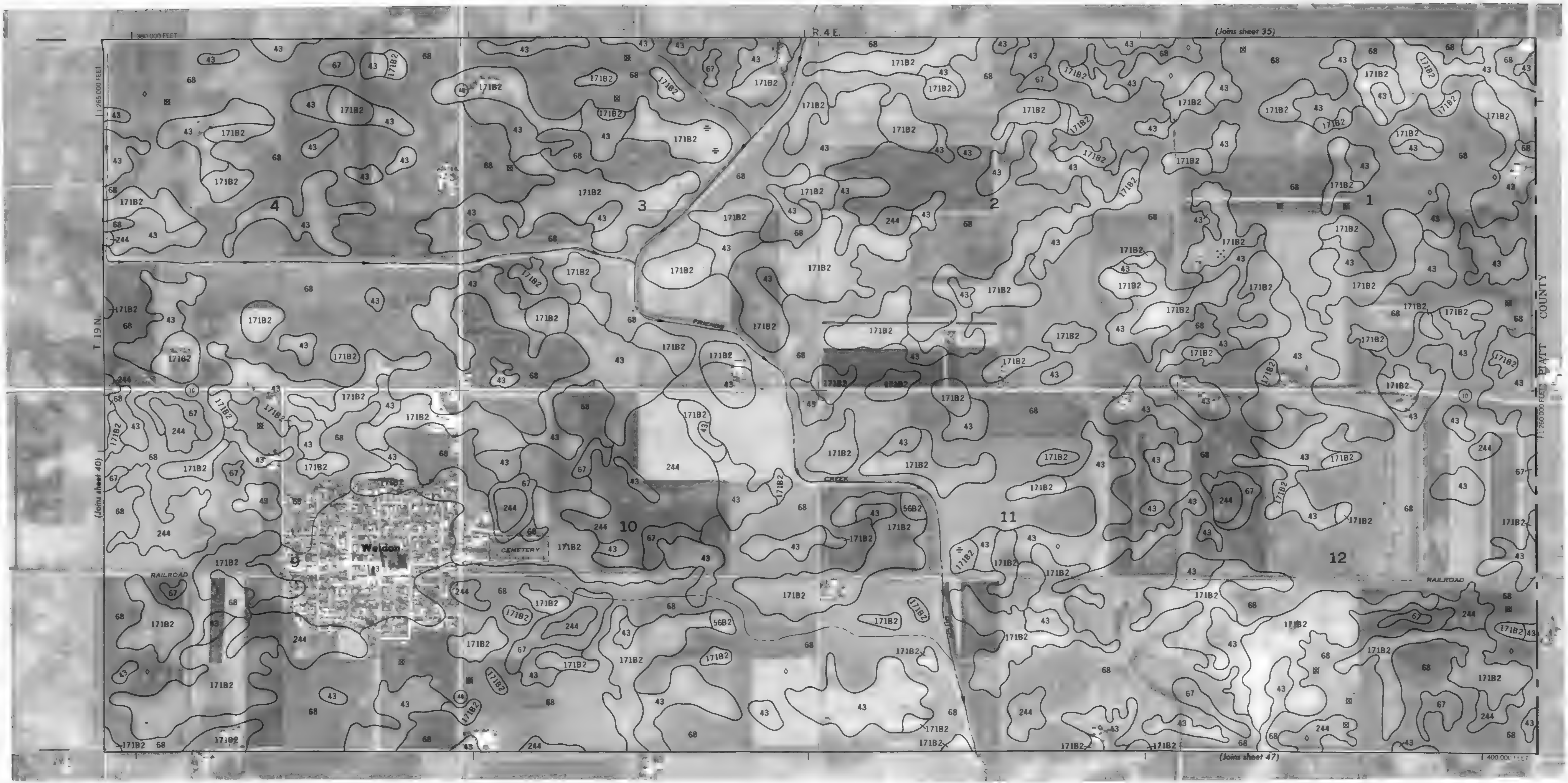
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

41

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 41



1 Mile | 3/4 | 1/2 | 1/4 | 0

5 000 | 4 000 | 3 000 | 2 000 | 1 000 | 0 | 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 42

N

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

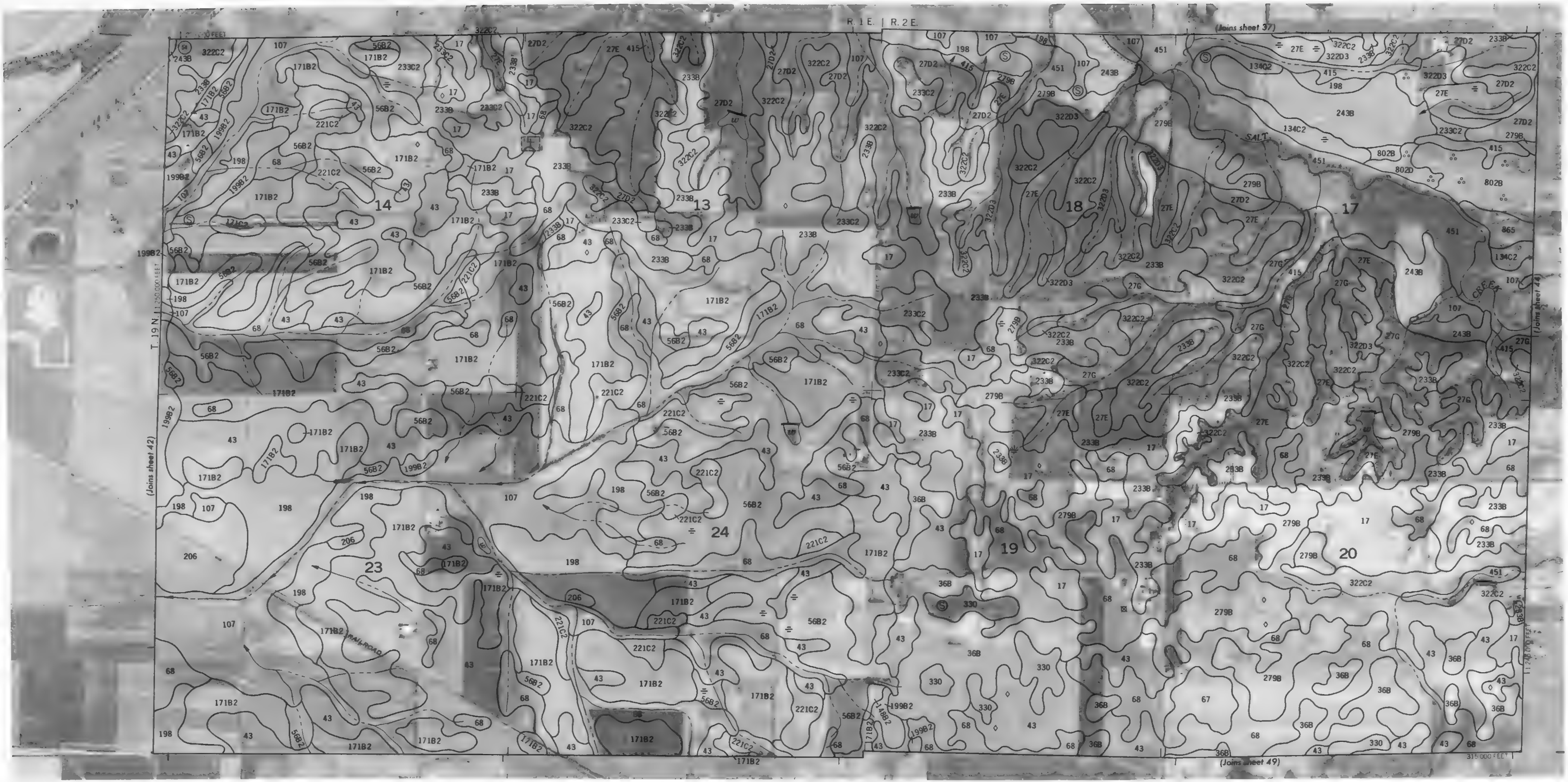
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 42

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

43

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 43

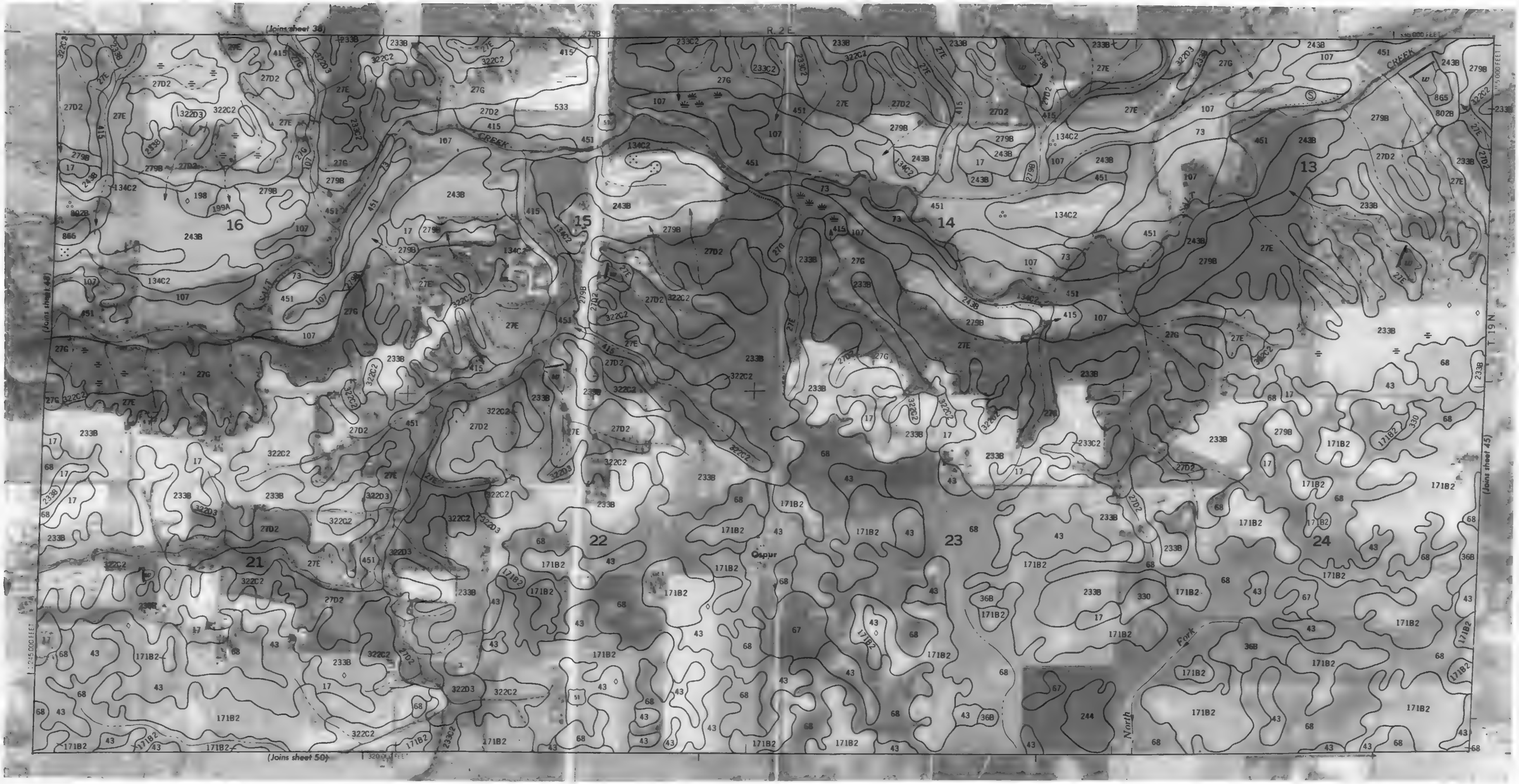
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 44

N



1 ¾ ½ ¼ 0 1 Mile
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 44

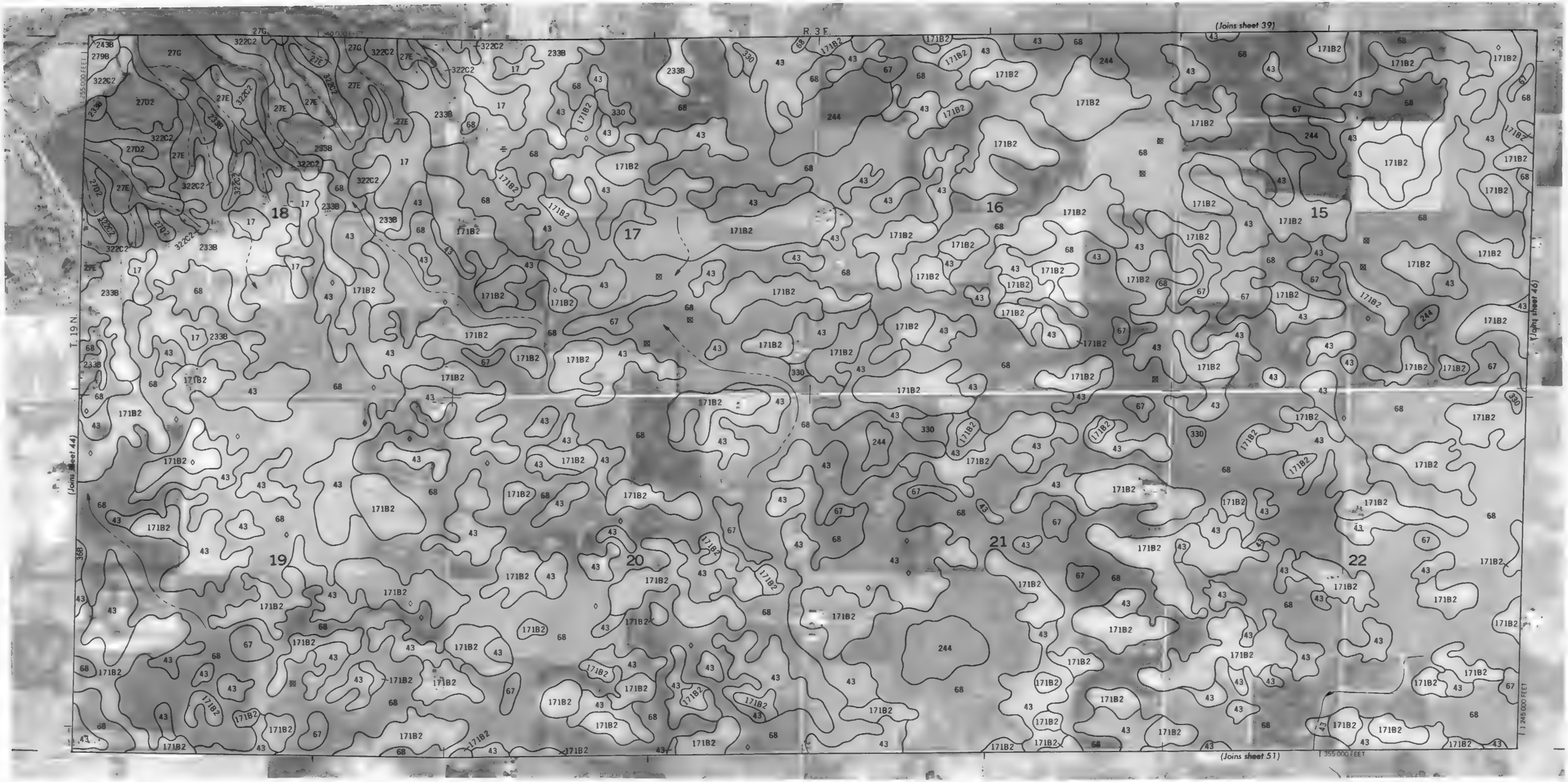
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

45

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 45



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

46

N

1 ¾ ½ ¼ 0 1 Mile

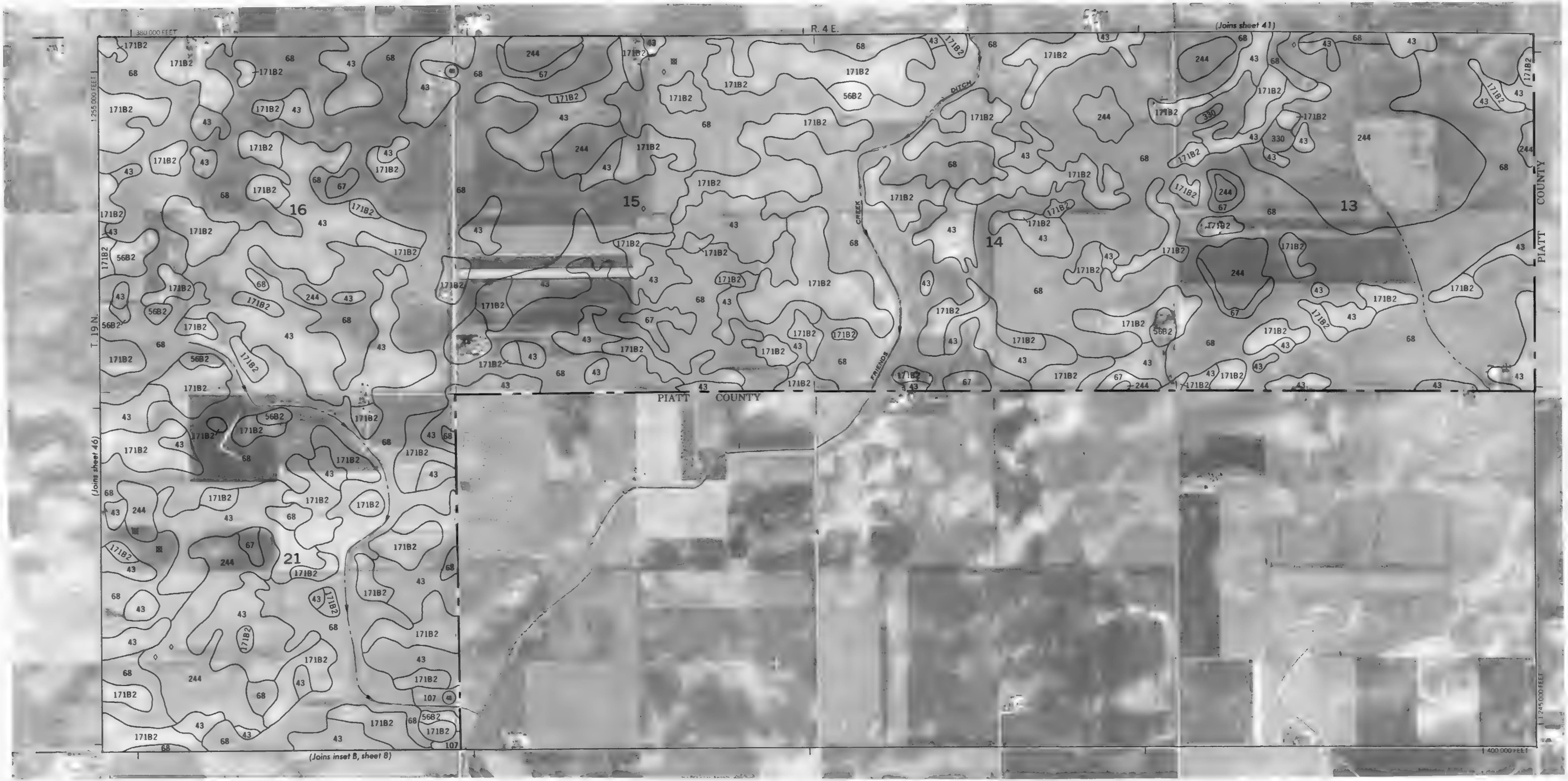
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 46

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 ¾ ½ ¼ 0 1 Mile

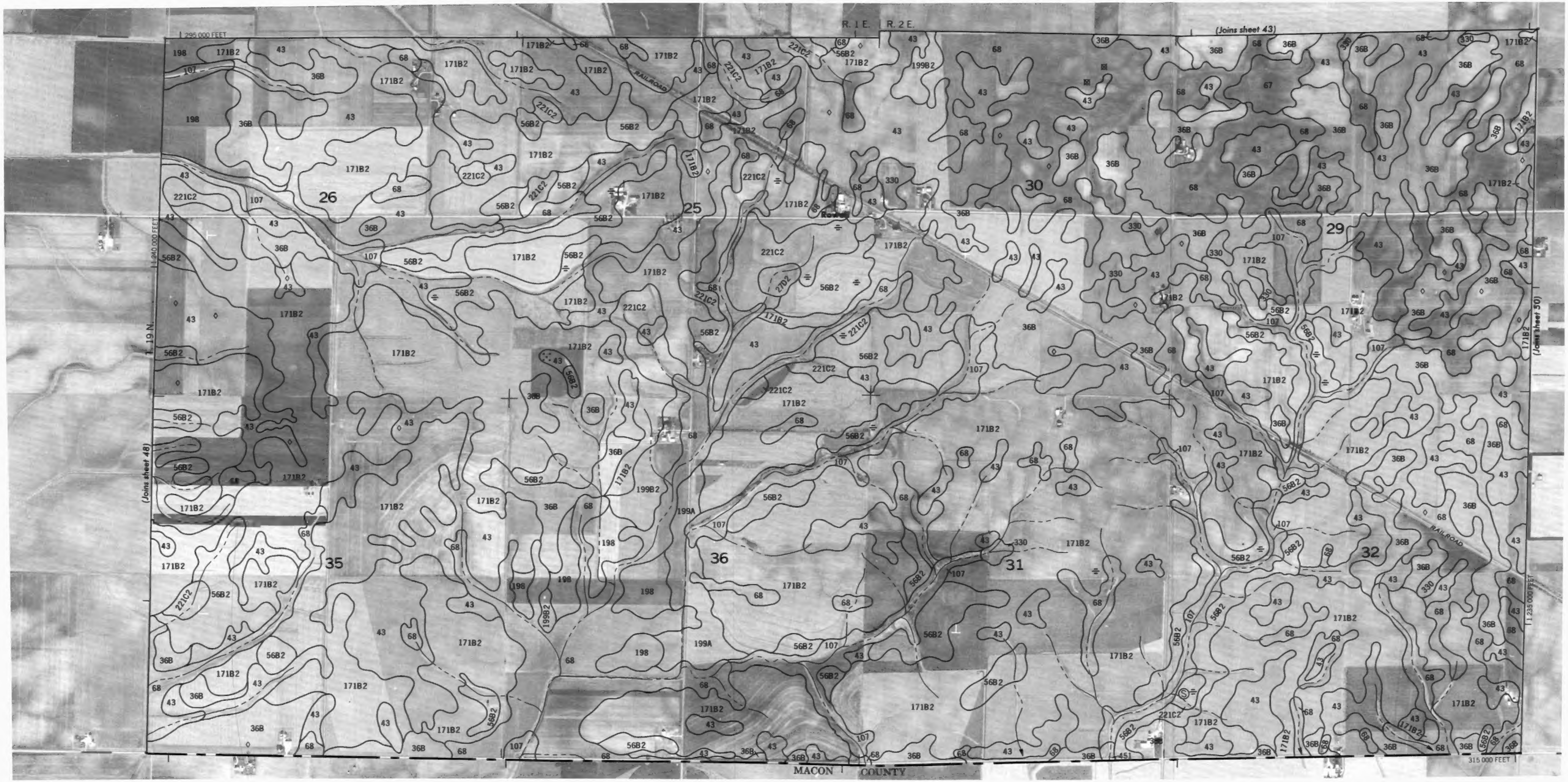
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 48

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

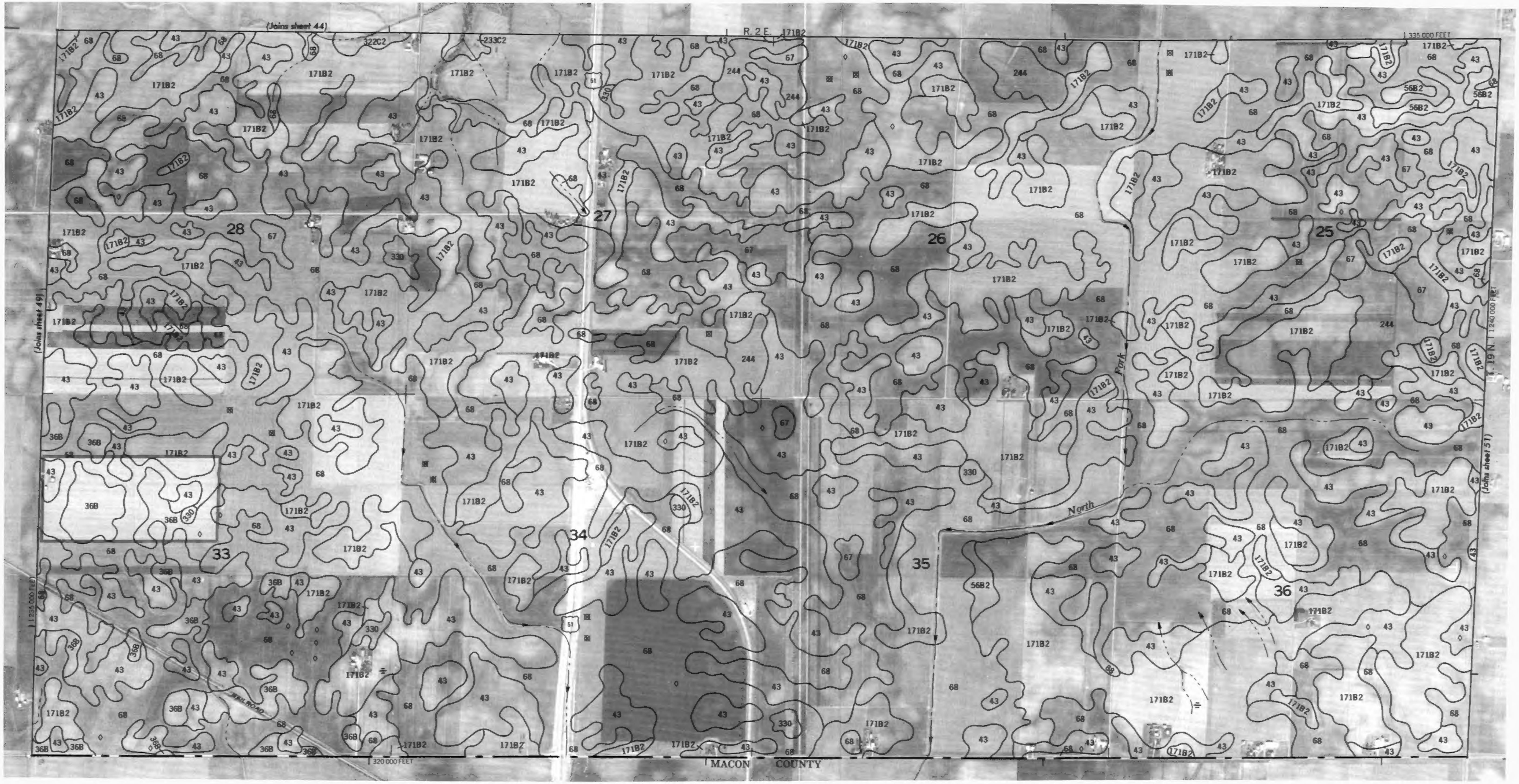
DEWITT COUNTY, ILLINOIS NO. 49

1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 50

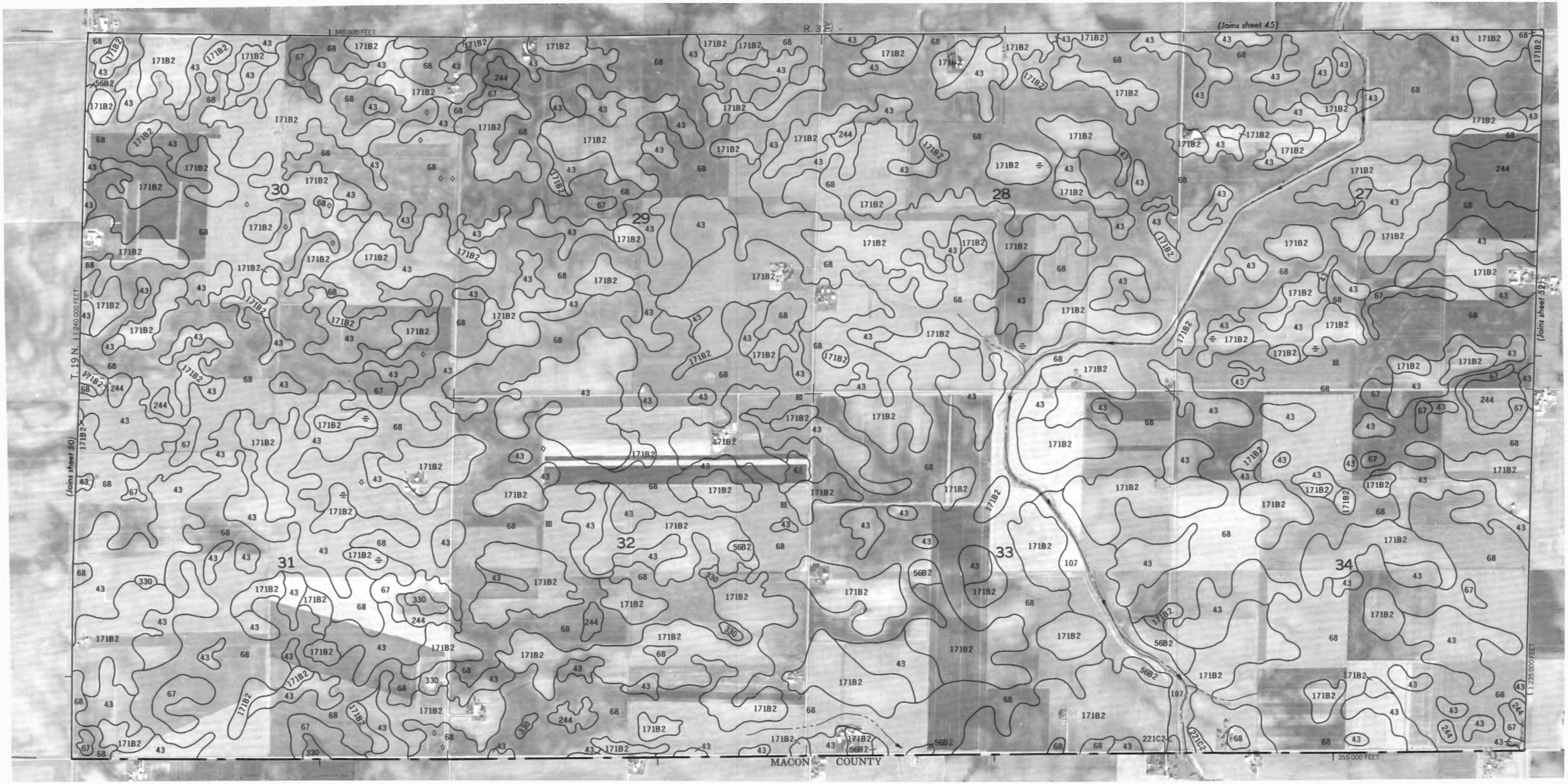
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

51

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DEWITT COUNTY, ILLINOIS NO. 51



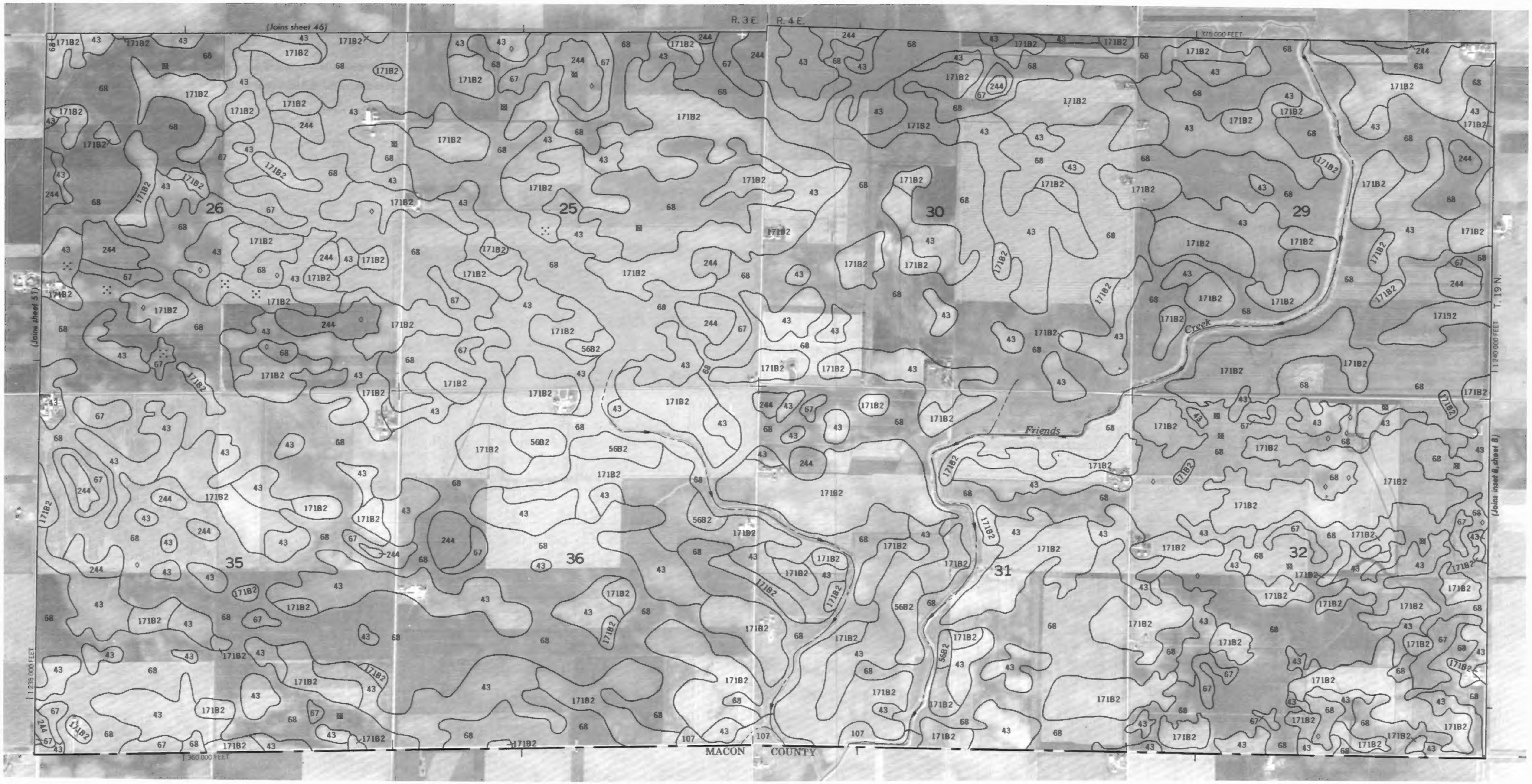
1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

N

SOIL SURVEY OF DEWITT COUNTY, ILLINOIS — SHEET NUMBER 52



1 ¾ ½ ¼ 0 1 Mile

5 000 4 000 3 000 2 000 1 000 0 5 000 Feet

Scale 1:15 840

DEWITT COUNTY, ILLINOIS NO. 52

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.